

# Introducing Windows Server 2008

*Mitch Tulloch with the  
Microsoft Windows Server  
Team*

[Purchase select Microsoft Press books at a discount](#)  
(available in the United States only)

To learn more about this book, visit Microsoft Learning at  
<http://www.microsoft.com/MSPress/books/11163.aspx>

9780735624214  
Publication Date: May 2007

**Microsoft**  
Press

## Additional Resources for IT Professionals

Published and Forthcoming Titles from Microsoft Press

### → Windows Server

#### Microsoft® Windows Server® 2003 *Resource Kit*

Microsoft MVPs and Partners with  
Microsoft Windows Server Team  
978-0-7356-2232-6

#### Microsoft Windows Server 2003 *Administrator's Companion* Second Edition

Charlie Russel, Sharon Crawford,  
and Jason Gerend  
978-0-7356-2047-6

#### Microsoft Windows Server 2003 *Inside Out*

William R. Stanek  
978-0-7356-2048-3

#### Microsoft Windows Server 2003 *Administrator's Pocket Consultant* Second Edition

William R. Stanek  
978-0-7356-2245-6

### → Windows Client

#### Windows Vista™ *Resource Kit*

Tulloch, Northrup, Honeycutt,  
Russel, and Wilson with the  
Microsoft Windows Vista Team  
978-0-7356-2283-8

#### Windows Vista *Administrator's Pocket Consultant*

William R. Stanek  
978-0-7356-2296-8

#### Microsoft Windows® XP Professional *Resource Kit* Third Edition

The Microsoft Windows Team with  
Charlie Russel and Sharon Crawford  
978-0-7356-2167-1

#### Microsoft Windows XP Professional *Administrator's Pocket Consultant* Second Edition

William R. Stanek  
978-0-7356-2140-4

#### Microsoft Windows Command-Line *Administrator's Pocket Consultant*

William R. Stanek  
978-0-7356-2038-4

### → SQL Server 2005

#### Microsoft SQL Server™ 2005 *Administrator's Pocket Consultant*

William R. Stanek  
978-0-7356-2107-7

#### Microsoft SQL Server 2005 *Administrator's Companion*

Whalen, Garcia, et al.  
978-0-7356-2198-5

#### Inside Microsoft SQL Server 2005: The Storage Engine

Kalen Delaney  
978-0-7356-2105-3

#### Inside Microsoft SQL Server 2005: T-SQL Programming

Itzik Ben-Gan, Dejan Sarka, and  
Roger Wolter  
978-0-7356-2197-8

### → Exchange Server 2007

Microsoft Exchange Server 2007  
*Administrator's Companion*  
Walter Glenn and Scott Lowe  
978-0-7356-2350-7

Microsoft Exchange Server 2007  
*Administrator's Pocket Consultant*  
William R. Stanek  
978-0-7356-2348-4

### → Scripting

Microsoft Windows PowerShell™  
*Step by Step*  
Ed Wilson  
978-0-7356-2395-8

Microsoft VBScript  
*Step by Step*  
Ed Wilson  
978-0-7356-2297-5

Microsoft Windows  
Scripting with WMI:  
Self-Paced Learning Guide  
Ed Wilson  
978-0-7356-2231-9

Advanced VBScript for Microsoft  
Windows Administrators  
Don Jones and Jeffery Hicks  
978-0-7356-2244-9

RELATED TITLES



Microsoft Office  
SharePoint® Server  
2007 *Administrator's  
Companion*  
Bill English with the  
Microsoft SharePoint  
Community Experts  
978-0-7356-2282-1



Microsoft Windows  
Security  
*Resource Kit*  
Second Edition  
Ben Smith and Brian  
Komar with the  
Microsoft Security  
Team  
978-0-7356-2174-9



Microsoft Windows  
Small Business  
Server 2003 R2  
*Administrator's  
Companion*  
Charlie Russel and  
Sharon Crawford  
978-0-7356-2280-7



Microsoft Internet  
Security and  
Acceleration (ISA)  
Server 2004  
*Administrator's Pocket  
Consultant*  
Bud Ratliff and Jason  
Ballard with the Microsoft  
ISA Server Team  
978-0-7356-2188-6

# Resources for IT Professionals



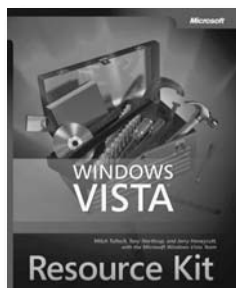
## Administrator's Pocket Consultant

- Practical, portable guide for fast answers when you need them
- Focus on core operations and support tasks
- Organized for quick, precise reference—to get the job done



## Administrator's Companion

- Comprehensive, one-volume guide to deployment and system administration
- Real-world insights, procedures, troubleshooting tactics, and workarounds
- Fully searchable eBook on CD



## Resource Kit

- In-depth technical information and tools from those who know the technology best
- Definitive reference for deployment and operations
- Essential toolkit of resources, including eBook, on CD



## Self-Paced Training Kit

- Two products in one: official exam prep guide + practice tests
- Features lessons, exercises, and case scenarios
- Comprehensive self-tests; trial software; eBook on CD

## Available in 2008 from Microsoft Press

### Windows Server

Windows Server® 2008  
*Resource Kit*  
978-0-7356-2361-3

Windows Server 2008  
Active Directory®  
*Resource Kit*  
978-0-7356-2515-0

Windows Server 2008  
Virtualization  
*Resource Kit*  
978-0-7356-2517-4

Windows Server 2008  
Security *Resource Kit*  
978-0-7356-2504-4

Windows® Administration  
*Resource Kit: Productivity Solutions For IT Professionals*  
978-0-7356-2431-3

Windows Server 2008  
Networking Guide  
978-0-7356-2422-1

Windows Server 2008 TCP/IP  
Protocols and Services  
978-0-7356-2447-4

Windows Server 2008  
*Inside Out*  
978-0-7356-2438-2

Windows Server 2008  
Terminal Services  
978-0-7356-2516-7

Windows Server 2008  
*Administrator's Companion*  
978-0-7356-2505-1

Windows Server 2008  
*Administrator's Pocket Consultant*  
978-0-7356-2437-5

Windows Group Policy Guide,  
Second Edition  
978-0-7356-2514-3

Understanding IPv6,  
Second Edition  
978-0-7356-2446-7

### Internet Information Services

Internet Information  
Services (IIS) 7.0  
*Administrator's Pocket Consultant*  
978-0-7356-2364-4

Internet Information  
Services (IIS) 7.0  
*Resource Kit*  
978-0-7356-2441-2

### Scripting

Windows PowerShell™  
Scripting Guide  
978-0-7356-2279-1

Windows PowerShell  
& Command-line  
*Administrator's Pocket Consultant*  
978-0-7356-2262-3

### Certification

*MCITP Self-Paced Training Kit*  
(Exams 70-640, 70-642,  
70-643, 70-646): Windows Server  
Administrator Core Requirements  
978-0-7356-2508-2

*MCTS Self-Paced Training Kit*  
(Exam 70-640): Configuring  
Windows Server 2008  
Active Directory  
978-0-7356-2513-6

*MCTS Self-Paced Training Kit*  
(Exam 70-642): Configuring  
Windows Server 2008  
Network Infrastructure  
978-0-7356-2512-9

*MCTS Self-Paced Training Kit*  
(Exam 70-643): Configuring  
Windows Server 2008  
Applications Platform  
978-0-7356-2511-2

*MCITP Self-Paced Training Kit*  
(Exam 70-646): Windows Server  
2008 Administrator  
978-0-7356-2510-5

*MCITP Self-Paced Training Kit*  
(Exam 70-647): Windows Server  
2008 Enterprise Administrator  
978-0-7356-2509-9

See our full line of learning resources at: [microsoft.com/mspress](http://microsoft.com/mspress) and [microsoft.com/learning](http://microsoft.com/learning)

**Microsoft®**

PUBLISHED BY

Microsoft Press  
A Division of Microsoft Corporation  
One Microsoft Way  
Redmond, Washington 98052-6399

Copyright © 2007 by Microsoft Corporation

All rights reserved. No part of the contents of this book may be reproduced or transmitted in any form or by any means without the written permission of the publisher.

Library of Congress Control Number: 2007924650

Printed and bound in the United States of America.

1 2 3 4 5 6 7 8 9 QWT 2 1 0 9 8 7

Distributed in Canada by H.B. Fenn and Company Ltd.

A CIP catalogue record for this book is available from the British Library.

Chapter 4 contains the “From the Experts: WMI Remote Connection” sidebar. Copyright © 2007 by Alain Lissoir.

Microsoft Press books are available through booksellers and distributors worldwide. For further information about international editions, contact your local Microsoft Corporation office or contact Microsoft Press International directly at fax (425) 936-7329. Visit our Web site at [www.microsoft.com/mspress](http://www.microsoft.com/mspress). Send comments to [tkinput@microsoft.com](mailto:tkinput@microsoft.com).

Microsoft, Microsoft Press, Active Directory, ActiveX, Aero, BitLocker, ClearType, Direct3D, Excel, Internet Explorer, Microsoft Dynamics, MSDN, MS-DOS, Outlook, PowerPoint, SharePoint, SQL Server, Terminal Services RemoteApp, Visual Basic, Visual Studio, Visual Web Developer, Win32, Windows, Windows CardSpace, Windows Live, Windows Media, Windows Mobile, Windows NT, Windows PowerShell, Windows Server, Windows Server System, Windows Vista, and WinFX are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. Other product and company names mentioned herein may be the trademarks of their respective owners.

The example companies, organizations, products, domain names, e-mail addresses, logos, people, places, and events depicted herein are fictitious. No association with any real company, organization, product, domain name, e-mail address, logo, person, place, or event is intended or should be inferred.

This book expresses the author’s views and opinions. The information contained in this book is provided without any express, statutory, or implied warranties. Neither the authors, Microsoft Corporation, nor its resellers, or distributors will be held liable for any damages caused or alleged to be caused either directly or indirectly by this book.

**Acquisitions Editor:** Martin DelRe

**Developmental Editor:** Karen Szall

**Project Editor:** Denise Bankaitis

Body Part No. X13-72717

# Table of Contents

<i>Preface</i> .....	xiii
<b>1 Introduction</b> .....	<b>1</b>
What's Between the Sheets .....	3
Acknowledgments .....	4
One Last Thing—Humor .....	7
<b>2 Usage Scenarios</b> .....	<b>9</b>
Providing an Identity and Access Infrastructure .....	10
Ensuring Security and Policy Enforcement .....	10
Easing Deployment Headaches .....	11
Making Servers Easier to Manage .....	12
Supporting the Branch Office .....	13
Providing Centralized Application Access .....	13
Deploying Web Applications and Services .....	14
Ensuring High Availability .....	14
Ensuring Secure and Reliable Storage .....	15
Leveraging Virtualization .....	16
Conclusion .....	16
<b>3 Windows Server Virtualization</b> .....	<b>17</b>
Why Enterprises Love Virtualization .....	17
Server Consolidation .....	18
Business Continuity .....	18
Testing and Development .....	19
Application Compatibility .....	19
Virtualization in the Datacenter .....	19

 **What do you think of this book? We want to hear from you!**

Microsoft is interested in hearing your feedback so we can continually improve our books and learning resources for you. To participate in a brief online survey, please visit:

[www.microsoft.com/learning/booksurvey/](http://www.microsoft.com/learning/booksurvey/)

Virtualization Today . . . . .	20
Monolithic Hypervisor . . . . .	22
Microkernelized Hypervisor . . . . .	22
Understanding Virtualization in Windows Server 2008 . . . . .	24
Partition 1: Parent . . . . .	25
Partition 2: Child with Enlightened Guest. . . . .	26
Partition 3: Child with Legacy Guest . . . . .	27
Partition 4: Child with Guest Running Linux. . . . .	28
Features of Windows Server Virtualization . . . . .	28
Managing Virtual Machines in Windows Server 2008 . . . . .	29
System Center Virtual Machine Manager 2007. . . . .	36
SoftGrid Application Virtualization . . . . .	36
Conclusion . . . . .	37
Additional Reading. . . . .	37
<b>4 Managing Windows Server 2008. . . . .</b>	<b>39</b>
Performing Initial Configuration Tasks . . . . .	39
Using Server Manager . . . . .	42
Managing Server Roles . . . . .	44
ServerManagerCmd.exe. . . . .	50
Remote Server Administration Tools . . . . .	53
Other Management Tools . . . . .	56
Group Policy . . . . .	56
Windows Management Instrumentation . . . . .	59
Windows PowerShell . . . . .	64
Microsoft System Center . . . . .	68
Conclusion . . . . .	69
Additional Resources . . . . .	69
<b>5 Managing Server Roles . . . . .</b>	<b>71</b>
Understanding Roles, Role Services, and Features . . . . .	71
Available Roles and Role Services . . . . .	72
Available Features. . . . .	83

Adding Roles and Features .....	95
Using Initial Configuration Tasks .....	97
Using Server Manager .....	104
From the Command Line .....	105
Conclusion .....	108
Additional Reading .....	108
<b>6 Windows Server Core .....</b>	<b>109</b>
What Is a Windows Server Core Installation? .....	109
Understanding Windows Server Core .....	111
The Rationale for Windows Server Core .....	115
Performing Initial Configuration of a Windows Server Core Server .....	118
Performing Initial Configuration from the Command Line .....	118
Managing a Windows Server Core Server .....	130
Local Management from the Command Line .....	130
Remote Management Using Terminal Services .....	137
Remote Management Using the Remote Server Administration Tools .....	140
Remote Administration Using Group Policy .....	141
Remote Management Using WinRM/WinRS .....	142
Windows Server Core Installation Tips and Tricks .....	143
Conclusion .....	147
Additional Resources .....	147
<b>7 Active Directory Enhancements .....</b>	<b>149</b>
Understanding Identity and Access in Windows Server 2008 .....	149
Understanding Identity and Access .....	149
Identity and Access in Windows 2000 Server .....	150
Identity and Access in Windows Server 2003 .....	151
Identity and Access in Windows Server 2003 R2 .....	152
Identity and Access in Windows Server 2008 .....	153
Active Directory Domain Services .....	158
AD DS Auditing Enhancements .....	158
Read-Only Domain Controllers .....	164
Restartable AD DS .....	168
Granular Password and Account Lockout Policies .....	169

Active Directory Lightweight Directory Services .....	172
Active Directory Certificate Services .....	176
Certificate Web Enrollment Improvements .....	176
Network Device Enrollment Service Support .....	177
Online Certificate Status Protocol Support .....	177
Enterprise PKI and CAPI2 Diagnostics .....	179
Other AD CS Enhancements .....	180
Active Directory Federation Services .....	182
Active Directory Rights Management Services .....	186
Conclusion .....	187
Additional Resources .....	187
<b>8 Terminal Services Enhancements .....</b>	<b>189</b>
Core Enhancements to Terminal Services .....	190
Remote Desktop Connection 6.0 .....	191
Single Sign-On for Domain-joined Clients .....	200
Other Core Enhancements .....	201
Installing and Managing Terminal Services .....	209
Terminal Services RemoteApp .....	216
Using TS RemoteApp .....	217
Benefits of TS RemoteApp .....	225
Terminal Services Web Access .....	226
Using TS Web Access .....	227
Benefits of TS Web Access .....	232
Terminal Services Gateway .....	232
Implementing TS Gateway .....	235
Benefits of TS Gateway .....	237
Terminal Services Licensing .....	238
Other Terminal Services Enhancements .....	243
Terminal Services WMI Provider .....	243
Windows System Resource Manager .....	246
Terminal Services Session Broker .....	247
Conclusion .....	249
Additional Resources .....	250

<b>9</b>	<b>Clustering Enhancements</b>	<b>251</b>
	Failover Clustering Enhancements	252
	Goals of Clustering Improvements	253
	Understanding the New Quorum Model	254
	Understanding Storage Enhancements	256
	Understanding Networking and Security Enhancements	259
	Other Security Improvements	261
	Validating a Clustering Solution	261
	Tips for Validating Clustering Solutions	266
	Setting Up and Managing a Cluster	267
	Creating a Highly Available File Server	269
	Performing Other Cluster Management Tasks	273
	Network Load Balancing Enhancements	278
	Conclusion	283
	Additional Resources	283
<b>10</b>	<b>Network Access Protection</b>	<b>285</b>
	The Need for Network Access Protection	286
	Understanding Network Access Protection	287
	What NAP Does	288
	NAP Enforcement Methods	289
	Understanding the NAP Architecture	297
	A Walkthrough of How NAP Works	299
	Implementing NAP	301
	Choosing Enforcement Methods	302
	Phased Implementation	303
	Configuring the Network Policy Server	307
	Configuring NAP Clients	317
	Troubleshooting NAP	319
	Conclusion	339
	Additional Resources	340

- 11 Internet Information Services 7.0. . . . . 341**
  - Understanding IIS 7.0 Enhancements . . . . . 341
    - Security and Patching. . . . . 342
    - Administration Tools. . . . . 351
    - Configuration and Deployment . . . . . 360
    - Diagnostics. . . . . 365
    - Extensibility . . . . . 368
    - What’s New in IIS 7.0 in Windows Server 2008 . . . . . 370
    - The Application Server Role . . . . . 371
  - Conclusion . . . . . 374
  - Additional Resources . . . . . 375
  
- 12 Other Features and Enhancements . . . . . 377**
  - Storage Improvements. . . . . 378
    - File Server Role . . . . . 378
    - Windows Server Backup . . . . . 381
    - Storage Explorer . . . . . 384
    - SMB 2.0. . . . . 386
    - Multipath I/O . . . . . 387
    - iSCSI Initiator . . . . . 390
    - iSCSI Remote Boot . . . . . 397
    - iSNS Server. . . . . 401
  - Networking Improvements . . . . . 402
  - Security Improvements . . . . . 407
  - Other Improvements . . . . . 414
  - Conclusion . . . . . 419
  - Additional Resources . . . . . 419
  
- 13 Deploying Windows Server 2008. . . . . 421**
  - Getting Windows Server 2008 . . . . . 421
  - Installing Windows Server 2008. . . . . 422
    - Manual Installation . . . . . 422
    - Unattended Installation . . . . . 423

Using Windows Deployment Services .....	423
Multicast Deployment .....	424
TFTP Windowing .....	427
EFI x64 Network Boot Support .....	430
Solution Accelerator for Windows Server Deployment.....	431
Understanding Volume Activation 2.0 .....	432
Conclusion .....	439
Additional Resources .....	440
<b>14 Additional Resources .....</b>	<b>441</b>
Product Home Page .....	441
Microsoft Windows Server TechCenter .....	442
Microsoft Download Center .....	442
Microsoft Connect.....	443
Microsoft TechNet.....	445
Beta Central .....	445
TechNet Events.....	446
TechNet Virtual Labs.....	448
TechNet Community Resources .....	448
TechNet Columns.....	451
TechNet Magazine.....	451
TechNet Flash Newsletter.....	451
MSDN .....	451
Blogs .....	452
Blogs by MVPs.....	453
Channel 9 .....	454
Microsoft Press Books.....	454
Conclusion .....	455
<b>Index.....</b>	<b>457</b>

**What do you think of this book? We want to hear from you!**

Microsoft is interested in hearing your feedback so we can continually improve our books and learning resources for you. To participate in a brief online survey, please visit:

[www.microsoft.com/learning/booksurvey/](http://www.microsoft.com/learning/booksurvey/)

# Usage Scenarios

<b>In this chapter:</b>	
Providing an Identity and Access Infrastructure . . . . .	10
Ensuring Security and Policy Enforcement . . . . .	10
Easing Deployment Headaches . . . . .	11
Making Servers Easier to Manage . . . . .	12
Supporting the Branch Office . . . . .	13
Providing Centralized Application Access . . . . .	13
Deploying Web Applications and Services . . . . .	14
Ensuring High Availability . . . . .	14
Ensuring Secure and Reliable Storage . . . . .	15
Leveraging Virtualization . . . . .	16
Conclusion . . . . .	16

Before we jump into the technical stuff, let's pause and make a business case for deploying Microsoft Windows Server 2008 in your organization. Sure, there's a marketing element in doing this, and as a techie you'd rather get to the real stuff right away. However, reality for most IT pros means preparing RFPs for bosses, presenting slide decks showing ROI from planned implementations of products, and generally trying to work within the constraints of a meager budget created by pointy-headed executives who can't seem to understand how cool technology is and why they need it for their business.

So let's look briefly at how Windows Server 2008 can benefit your enterprise. I'm assuming you already know a few basic things about the new features and enhancements of the platform (otherwise, you wouldn't be going to TechEd '07 and similar events where this book is being distributed), but you might also want to give this chapter a re-read once you've finished the rest of the book. This will give you a better idea of what Windows Server 2008 is and what it's capable of.

Anyway, let's ask the sixty-four-dollar questions: Who needs Windows Server 2008? And why do I need it?

Oh yeah, I forgot:

<marketing jargon=ON>

## Providing an Identity and Access Infrastructure

At the core of any mid- or large-sized organization are controls—controls concerning who is allowed to access your organization's information resources, how you verify someone's identity, what they're allowed to do, how you enforce controls, and how you keep records for auditing and for increasing efficiency.

An umbrella name for all this is *Identity and Access Management*, or IDA. Organizations need an IDA solution that provides services for managing information about users and computers, making information resources available and controlling access to them, simplifying access using single sign-on, ensuring sensitive business information is adequately protected, and safeguarding your information resources as you communicate and exchange information with customers and business partners.

Why is Windows Server 2008 an ideal platform for building your IDA solution? Because it both leverages the basic functionality of Active Directory found in previous Windows Server platforms and includes new features and enhancements to Active Directory in Windows Server 2008. For example, you can now use Active Directory Domain Services (AD DS) auditing to maintain a detailed record of changes made to directory objects that records both the new value of an attribute that was changed and its original value. You can leverage the new support for Online Certificate Status Protocol in Active Directory Certificate Services (AD CS) to streamline the process of managing and distributing revocation status information across your enterprise. You can use several enhancements in Active Directory Rights Management Services (AD RMS) together with RMS-enabled applications to help you safeguard your company's digital information from unauthorized use more easily than was possible using RMS on previous Windows Server platforms. And you can use the integrated Active Directory Federation Services (AD FS) role to leverage the industry-supported Web Services (WS-\*) protocols to securely exchange information with business partners and provide a single sign-on (SSO) authentication experience for users and applications over the life of an online session.

Want to find out more about these enhancements? Turn to Chapter 7, "Active Directory Enhancements," to learn about all this and more. And with Windows Vista on the client side, you have added benefits such as an integrated RMS client, improved smart card support, and better integration with SSO and other Active Directory enhancements in Windows Server 2008.

## Ensuring Security and Policy Enforcement

Do users and computers connecting to your network comply with your company's security policy requirements? Is there any way to enforce that this is indeed the case? Yes, there is. In addition to standard policy enforcement mechanisms such as Group Policy and Active Directory authentication, Windows Server 2008 also includes the new Network Access Protection (NAP) platform. NAP provides a platform that helps ensure that client computers

trying to connect to your network meet administrator-defined requirements for system health as laid out in your security policy. For example, NAP can ensure that computers connecting to your network to access resources on it have all critical security updates, antivirus software, the latest signature files, a functioning host-based firewall that's properly configured, and so on. And if NAP determines that a client computer doesn't meet all these health requirements, it can quarantine the computer on an isolated network until remediation can be performed or it can deny access entirely to the network. By using the power of NAP, you can enforce compliance with your network health requirements and mitigate the risk of having improperly configured client computers that might have been exposed to worms and other malware.

Want to find out more about NAP? Turn to Chapter 10, "Implementing Network Access Protection," where I have a comprehensive description of the platform and how it's implemented using Windows Server 2008 together with Windows Vista.

And if you *really* want to enhance the security of your servers, try deploying the Windows server core installation option of Windows Server 2008 instead of the full installation option. The Windows server core installation option has a significantly smaller attack surface because all nonessential components and functionality have been removed. Want to learn about this installation option? Turn to Chapter 6, "Windows Server Core," for a detailed walkthrough of its capabilities and tasks related to its management.

## Easing Deployment Headaches

Do you currently use third-party, image-based deployment tools to deploy your Windows servers? I'm not surprised—until Microsoft released the Windows Automated Installation Kit (Windows AIK), you were pretty much limited to either deploying Windows using third-party imaging tools or using Sysprep and answer files. The Windows AIK deploys Windows Vista based on Vista's new componentized, modular architecture and Windows image (.wim) file-based installation media format. Windows Vista and the Windows AIK has changed everything, and now Microsoft has finally come on strong in the deployment tools arena. And with the release of the Microsoft Solution Accelerator for Business Desktop Deployment (BDD) 2007 customers now have a best-practice set of comprehensive guidance and tools from Microsoft that they can use to easily deploy Windows Vista and the 2007 Office system across an enterprise.

So deploying Windows clients is a snap now, but what about deploying Windows servers? Windows Server 2008 includes huge improvements in this area with its new Windows Deployment Services role, an updated and redesigned version of the Remote Installation Services (RIS) feature found in Windows Server 2003 and Windows 2000 Server. Windows Deployment Services enables enterprises to rapidly deploy Windows operating systems using network-based installation, a process that doesn't require you to be physically present at each target computer or to install directly from DVD media.

And if you liked BDD 2007, you'll like the similar set of guidance and tools that Microsoft is currently developing for deploying Windows Server 2008 machines. This new set of tools and best practices will be called the *Solution Accelerator for Windows Server Deployment* and it will integrate the capabilities of Windows AIK, ImageX, Windows Deployment Services, and other deployment tools to provide a point-and-click, drag-and-drop deployment experience similar to what you've experienced with BDD 2007 if you've had a chance to play with it already.

Deploying systems is a headache sometimes, but managing licensing and activation of these machines can bring on a migraine. Instead of taking two pills and going to bed, however, you'll find that the enhancements made to Volume Activation 2.0 in Windows Server 2008 take the pain away. This improved feature will also help you sleep at night, knowing that your machines are in compliance with licensing requirements.

Want to read more about all these improvements? Crack open Chapter 13, "Deploying Windows Server 2008," and you'll find everything you need to get you started in this area.

## Making Servers Easier to Manage

I usually don't get excited about tools—they're designed to get the job done and nothing more. Sure, some people might buy a new compound miter saw, show it to all their neighbors, and go "Ooh, aah." Not me—maybe it's because I'm a geek and I get excited about quad-core processors instead! Still, you've gotta love tools when they make life easier, and Windows Server 2008 includes a slate of new and improved tools for managing Windows Server 2008 machines throughout your enterprise.

There's Server Manager, an integrated MMC console that provides a single source for managing your server's roles and features and for monitoring your server's status. Server Manager even comes in a command-line version called `ServerManagerCmd.exe`, which you can use to quickly add role services and features or perform "what if" scenarios such as, "What components would get installed if I added the Web Server role on my system?"

Then there's Windows PowerShell, a command-line shell and scripting language that includes more than 130 *cmdlets*, plus an intuitive scripting language specifically designed for IT pros like you. As of the Beta 3 release of Windows Server 2008, PowerShell is now included as an optional component you can install. PowerShell is a powerful tool for performing administration tasks on Windows Server 2008, such as managing services, processes, and storage. And PowerShell can also be used to manage aspects of certain server roles such as Internet Information Services (IIS) 7.0, Terminal Services, and Active Directory Domain Services.

Then there's the Windows Remote Shell (WinRS) and Windows Remote Management (WinRM) components first included in Windows Vista; enhancements to Windows Management Instrumentation (WMI), also introduced in Windows Vista; improvements in

how Group Policy works, including both changes in Windows Vista and in Windows Server 2008; and more.

Where can you learn more about these different tools? Try Chapter 4, “Managing Windows Server 2008” for a start. Then turn to Chapter 6 and to Chapter 11, “Internet Information Services 7.0,” for more examples of seeing these tools at work. Managing your Windows servers has never been easier than using what the Windows Server 2008 platform provides for you to do this.

## Supporting the Branch Office

It would be nice if all your servers were set up in a single location so that you could keep an eye on them, wouldn't it? Unfortunately, today's enterprise often consists of a corporate headquarters and a bunch of remote branch offices, sometimes scattered all around the globe. What's worse, you might be the main IT person stuck there at headquarters, while people who don't know a router from a switch have hands-on physical access to your servers, which just happen to be located out there in remote sites instead of being safe under your watchful eye. What can you do to maintain control? “My precioussss! gollum...”

Windows Server 2008 has several technologies that help you keep control and be Lord of the Servers in your enterprise. Read-Only Domain Controllers (RODCs) are a new type of domain controller that hosts a read-only replica of your Active Directory database. If you combine RODCs with the BitLocker Drive Encryption feature first introduced in Windows Vista, you no longer have to worry about thieves (or silly employees) walking off with one of your domain controllers and all your goodies. Restartable Active Directory Domain Services lets you stop Active Directory services on your domain controllers so that updates can be applied or offline defragmentation of the database can be performed, and it can do this without requiring you to reboot your machine. This is a big improvement that not only reduces downtime, but makes your domain controllers easier to manage, which is a plus when they're located at a remote site. Other improvements—such as delegation improvements, the new SMB 2.0 protocol, and the enhanced DFSR introduced in Windows Server 2003 R2—help make Windows Server 2008 an ideal platform for domain controllers that need to be located at branch offices.

Want to find out more about these improvements? Chapter 7 covers RODC and Restartable AD DS, while various other improvements can be found in Chapter 12, “Other Features and Enhancements.”

## Providing Centralized Application Access

Mobile users can be a pain to support. Although virtual private network (VPN) technologies have made remote access simpler, giving remote users full access to your internal network from over the Internet is often not the best solution. With the improvements to Terminal

Services in Windows Server 2008, however, users (both remote and on the network) can securely access business applications running on your Terminal Servers and have the same kind of experience as if these applications were installed locally on their machines.

Terminal Services Gateway (TS Gateway) lets remote users securely punch through your perimeter firewall and access Terminal Servers running on your corpnet. Terminal Services RemoteApp enables remoting of individual application windows instead of the whole desktop so that an application that is actually running on a Terminal Server looks and feels to the user as if it were running on her own desktop. And Terminal Services Web Access makes application deployment a snap—the user visits a Web site, clicks on a link or icon, and launches an application on a Terminal Server located somewhere in a galaxy far, far away.

Interested in learning more about these new features and enhancements to Terminal Services in Windows Server 2008? Flip to Chapter 8, “Terminal Services Enhancements,” and you’ll find a ton of information on the subject.

## **Deploying Web Applications and Services**

Does your organization rely on providing Web applications and Web services to customers? Is the Web a way of life for your business? The new features and enhancements found in Internet Information Services 7.0 are going to excite you if that’s the case.

Hosting companies will benefit from xcopy deployment, which copies both a site’s content and its configuration to the Web server in one single action. The new modular architecture of IIS 7.0 will make a difference in datacenters because it enables you to deploy Web servers that have a low footprint and minimal attack surface.

Enterprises that build B2B and B2C solutions that rely on the .NET Framework 3.0 can use the Application Server role of Windows Server 2008 to leverage industry-standard Web Services (WS-\*) protocols for building these solutions on top of IIS 7.0. And Windows System Resource Manager and other components can help you make efficient use of your hardware resources and ensure a consistent end-user experience.

Want to learn more about IIS 7.0 and the Application Server role? Turn to Chapter 11 for a whirlwind tour of these topics.

## **Ensuring High Availability**

I get miffed when I try to buy a book online from some bookstore and have to wait more than five seconds for the check-out page to appear, or if the site temporarily seems to go down. What’s wrong with these guys? Don’t they understand high availability? What, are they running their entire store on a single box? Don’t they know *single point of failure*?

Whatever applications are critical to the operation of your business, you need to use some form of clustering to make sure they never go down or become inaccessible to customers. Windows Server 2008 includes two enhancements in the area of high availability. First, server clusters (now called *failover clusters*) have been significantly improved to make them simple to set up and configure, easier to manage, more secure, and more stable. Improvements have been made in the way the cluster communicates with storage, which can increase performance for both storage area network (SAN) and direct attached storage (DAS). Failover clusters also offer new configuration options that can eliminate the quorum resource from being a single point of failure.

Network Load Balancing (NLB) has also been improved in Windows Server 2008 to include support for IPv6 and the NDIS 6.0 specification. And the WMI provider has been enhanced with new functionality to make NLB solutions more manageable.

Has this piqued your interest? Check out Chapter 9, “Clustering Enhancements,” and find out more.

## Ensuring Secure and Reliable Storage

I used to think file servers were boring until I learned about the new storage features and enhancements in Windows Server 2008. Not any more. The Share And Storage Management snap-in provided by the File Server role makes managing volumes and shares easier than ever before with its two new wizards. The Provision Storage Wizard provides an integrated storage provisioning experience for performing tasks like creating a new LUN, specifying the LUN type, unmasking a LUN, and creating and formatting a volume. The wizard also supports multiple protocols—including Fibre Channel, iSCSI, and SAS—and it requires only a VDS 1.1 hardware provider. The Provision A Shared Folder Wizard provides an integrated file-share provisioning experience that lets you easily configure permissions, quotas, file screens, and other settings for SMB shares, and it supports NFS shares also.

Then there’s Storage Explorer, a new MMC snap-in that provides a tree-structured view of detailed information concerning all the components of your Fibre Channel or iSCSI SAN, including Fabrics, Platforms, Storage Devices, and LUNs. And it provides integrated support for Microsoft Multipath IO (MPIO), which enables software and hardware vendors to develop multipathing solutions that work effectively with solutions built using Windows Server 2008 and vendor-supplied storage hardware devices. And the built-in iSCSI Initiator lets you configure a target iSCSI storage device, plug your server and storage device into a Gigabit Ethernet switch, and—presto!—you’ve now got high-speed block storage over IP. And there’s iSCSI Boot, which lets you install Windows Server 2008 directly to an iSCSI volume on a SAN. The enhanced Windows Server Backup uses the same block-level, image-based (.vhd) backup technology that is used by the CompletePC Backup And Recovery feature of Windows Vista.

How’s all that for your lowly, much-maligned file server? Find out more about storage improvements and lots more in Chapter 12.

## Leveraging Virtualization

Last but not least (in fact, so *not* least that we'll be covering this topic in our very next chapter), there's Windows Server Virtualization, which will change (once it's released after Windows Server 2008 is released) the entire architecture of Windows servers in fundamental ways. And even though Windows Server Virtualization is still in an early stage of development at the time of writing this book, IT pros like you already know the power virtualization technologies have to affect today's enterprises through server consolidation, business continuity management, development and testing environments, application compatibility, and datacenter workload decoupling.

I won't go into more details about Windows Server Virtualization here—turn to Chapter 3, “Windows Server Virtualization,” and get a preview.

## Conclusion

<marketing jargon=OFF>

Whew, that's a relief! That's not the hat I usually wear, because I'm a geek and not a hawker of wares and potions. I'm glad that's over with because now we can get to the technical stuff that we IT pros love to talk about. But, in point of fact, I respect the marketing professionals for what they have to do. If they don't get the news out there about Windows Server 2008, who's going to buy it? And if people don't buy it, how can Microsoft stay in business? And if Microsoft goes out of business, how can I write about their products, make money, and feed my family?

Anyway, now that all that's out of the way, let's dig into the technical stuff and get down and geeky.