

**Microsoft Windows
Server 2008 R2
Administrator's Reference**
The Administrator's Essential Reference

Microsoft Windows Server 2008 R2 Administrator's Reference

The Administrator's Essential Reference

Dustin Hannifin

Naomi J. Alpern

Joey Alpern

Aaron Tiensivu, Technical Editor



ELSEVIER

AMSTERDAM • BOSTON • HEIDELBERG • LONDON
NEW YORK • OXFORD • PARIS • SAN DIEGO
SAN FRANCISCO • SINGAPORE • SYDNEY • TOKYO

Syngress is an imprint of Elsevier

SYNGRESS®

Acquiring Editor: Angelina Ward
Project Manager: Paul Gottehrer
Designer: Joanne Blank

Syngress is an imprint of Elsevier
30 Corporate Drive, Suite 400, Burlington, MA 01803, USA

© 2010 Elsevier, Inc. All rights reserved.

No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or any information storage and retrieval system, without permission in writing from the publisher. Details on how to seek permission, further information about the Publisher's permissions policies and our arrangements with organizations such as the Copyright Clearance Center and the Copyright Licensing Agency, can be found at our website: www.elsevier.com/permissions.

This book and the individual contributions contained in it are protected under copyright by the Publisher (other than as may be noted herein).

Notices

Knowledge and best practice in this field are constantly changing. As new research and experience broaden our understanding, changes in research methods or professional practices, may become necessary. Practitioners and researchers must always rely on their own experience and knowledge in evaluating and using any information or methods described herein. In using such information or methods they should be mindful of their own safety and the safety of others, including parties for whom they have a professional responsibility.

To the fullest extent of the law, neither the Publisher nor the authors, contributors, or editors, assume any liability for any injury and/or damage to persons or property as a matter of products liability, negligence or otherwise, or from any use or operation of any methods, products, instructions, or ideas contained in the material herein.

Library of Congress Cataloging-in-Publication Data

Application Submitted

British Library Cataloguing-in-Publication Data

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

ISBN: 978-1-59749-578-3

Printed in the United States of America

10 11 12 13 14 10 9 8 7 6 5 4 3 2 1

Working together to grow libraries in developing countries		
www.elsevier.com www.bookaid.org www.sabre.org		
ELSEVIER	BOOK AID International	Sabre Foundation

For information on all Syngress publications visit our website at www.syngress.com

*This book is dedicated to my grandfathers. Two men who will
forever be the greatest of role models.*

Contents

About the Author.....	xix
Acknowledgments	xxi
CHAPTER 1 Introduction to Windows Server 2008 R2	1
What is new in Windows Server 2008 R2.....	1
Virtualization (Hyper-V).....	1
BranchCache.....	2
Active Directory.....	2
Internet Information Server 7.5	3
PowerShell.....	3
DirectAccess.....	4
File Classification Infrastructure.....	4
Remote Desktop Services	5
Windows Server 2008 R2 editions.....	5
Planning a Windows Server 2008 R2 deployment.....	6
Making the business case for Windows Server 2008 R2.....	6
Create a project plan.....	9
Document the existing network and server infrastructure.....	9
Security and legal planning.....	10
Planning for backup and disaster recovery	10
Planning for licensing and activation.....	11
Design your Windows Server 2008 R2 infrastructure.....	12
Test your design and project plan.....	14
Summary.....	15
CHAPTER 2 Installing and configuring Windows Server 2008 R2.....	17
Preparing to install Windows Server 2008 R2.....	17
Hardware requirements	17
Preparing the hardware	19
Choosing to upgrade or perform a custom installation	19
Selecting the edition and installation option.....	20
Installing Windows Server 2008 R2.....	22
Installing Windows Server 2008 R2—Server Core.....	27
Upgrading from previous Windows versions.....	28
Performing postinstallation tasks.....	30
Configuring initial settings.....	32
Understanding roles and features.....	35

Windows Server 2008 R2 roles	36
Installing additional software	36
Configuring disk drives	41
Finalizing the configuration	49
Product activation and Key Management Services.....	49
Understanding Windows Server 2008 R2 product activation	49
Overview of Key Management Services.....	51
Designing a KMS infrastructure	53
Installing and configuring KMS	54
Automating the installation process.....	55
Overview of Windows Deployment Services	55
Installing and configuring WDS	56
Unattended installation and automated deployment	61
Administration basics	61
Microsoft Management Console 101.....	61
Overview of Server Manager.....	64
Introduction to PowerShell	66
Windows Server 2008 R2 administration tools	67
Installation and Configuration Checklist.....	71
Summary	72
CHAPTER 3 Windows Server 2008 R2 networking.....	73
Overview of Windows Server 2008 R2 Networking.....	73
Network and Sharing Center.....	73
Redesigned TCP/IP Network Stack	74
DNS enhancements	74
Policy-based QoS	75
SMB 2.0.....	75
Windows Firewall	76
IPv6 support.....	76
Network awareness.....	77
Network Access Protection	78
DirectAccess	78
Exploring Network and Sharing Center	78
Network profiles.....	81
Planning and Deploying a TCP/IP Network Infrastructure.....	82
Introduction to TCP/IP.....	82
IP addresses	82
Introduction to IPv6	86
Designing IP networks	87
Policy-based QoS	88

Routing and Remote Access	95
Installing Routing and Remote Access.....	96
Configuring Routing and Remote Access to support Remote Access VPN.....	98
Planning and Deploying DNS.....	105
Overview of name resolution and DNS	105
DNS zones	106
DNS records	108
Designing a DNS infrastructure.....	109
Deploying DNS	111
Installing the DNS Server role	111
Configuring DNS Servers	111
Setting up DNS zones	115
Dynamic DNS records	122
DNS and Active Directory.....	122
Securing DNS.....	123
Monitoring and troubleshooting DNS	123
Overview of WINS.....	127
Planning and Deploying DHCP.....	129
Overview of DHCP	129
Planning for DHCP	131
Deploying DHCP.....	133
Administering and troubleshooting DHCP.....	136
Network Monitoring and Troubleshooting Utilities.....	137
Using ping, PathPing, and NSLookup.....	137
Overview of Network Monitor	138
Summary	140
CHAPTER 4 Feature focus: Active Directory.....	141
What is new in active directory?.....	141
Active Directory Recycle Bin.....	141
Offline Domain Join.....	145
Active Directory module for PowerShell	148
Active Directory Best Practices Analyzer.....	149
Active Directory Web Services	151
Active Directory Administrative Center.....	151
Managed service accounts.....	151
Planning for active directory.....	152
Active Directory basics	152
Planning for Active Directory forest and domains	153
Active Directory and DNS.....	156

Planning for domain controllers	158
Planning for Active Directory sites and replication	158
Global Catalog servers	159
Planning for operations masters.....	161
Planning for domain and forest functional levels	161
Installing and configuring Active Directory domain services.....	162
Active directory administration basics	170
Active Directory Users and Computers.....	170
Administering user and computers	175
User accounts.....	175
Account usernames, passwords, and security policies.....	176
Administering computer accounts	182
Administering groups and organizational units.....	182
Administering groups	182
Administering organizational units.....	184
Administering group policy	186
Overview of group policy	188
Creating and managing Group Policy Objects.....	190
Troubleshooting Group Policy.....	191
Other active directory services	194
Active directory certificate services	194
Planning for Active Directory Certificate Services	194
Deploying Active Directory Certificate Services.....	198
Active Directory federation services	213
Planning for Active Directory Federation Services	214
Deploying Active Directory Federation Services	216
Active directory lightweight directory services	241
Installing and configuring Active Directory Lightweight Directory Services	241
Active directory rights management services	246
Commonly used active directory powershell commands	246
Summary	246
CHAPTER 5 Windows Server 2008 R2 file and print services.....	249
Overview of file and print services	249
Administering file shares	250
Creating shared folders	250
Securing shared folders	252
Publishing shared folders to Active Directory	263
Administering distributed file system services	263
Configuring and administering DFS Namespaces	265

Configuring and administering DFS Replication	271
File Server Resource manager	280
Quota management	281
File screening management	282
Storage reports	283
Classification management	283
File management tasks	284
Services for network file system	285
Windows search service	286
Branch cache for network files	287
Administering print and document services	287
Installing print services	287
Administering a print server	289
Line Printer Daemon service	297
Internet Printing	297
Distributed scan server	298
Summary	300
CHAPTER 6 Internet Information Services 7.5 feature focus	301
Overview of Internet Information services 7.5	301
Request Filtering Module	302
Best Practices Analyzer	302
PowerShell Module	302
Support for managed service accounts	302
Planning to deploy IIS 7.5 web servers	303
Installing and configuring IIS 7.5	303
Administering IIS 7.5 web sites	311
IIS Web sites	311
Application pools	311
Creating Web sites	311
Administering the IIS 7.5 FTP publishing service	314
Summary	317
CHAPTER 7 Hyper-V feature focus	319
Introduction to virtualization and Hyper-V	319
Hyper-V changes	321
Live Migration	321
Processor enhancements	322
Storage enhancements	323
Network enhancements	323

Planning for Hyper-V	323
Licensing considerations	323
Hyper-V system requirements and capacity planning	324
Planning for features	325
Installing and administering Hyper-V	326
Administering virtual networks.....	327
Administering Hyper-V host settings	331
Creating and administering Hyper-V virtual machines	334
Virtual machine files.....	335
Virtual machine disk types	335
Creating and configuring a virtual machine.....	336
Supported virtual machine operating systems.....	340
Installing the guest operating system	341
Updating virtual machine settings	343
High availability, Live Migration, and snapshots	348
Live Migration.....	348
Configuring Hyper-V to support Live Migration.....	349
Snapshots	350
Introduction to system center virtual machine manager 2008 R2	351
System requirements for system center virtual machine manager....	352
Summary	352

CHAPTER 8 Windows Server 2008 R2 Remote Desktop Services	353
Overview of remote desktop services.....	353
What is new in remote desktop services.....	354
Remote Desktop Session Host.....	354
Remote Desktop Virtualization Host.....	355
RemoteApp and Desktop Connection.....	355
Remote Desktop Connection Broker	356
Remote Desktop Gateway.....	356
Remote Desktop Web Access.....	357
Remote Desktop Client Experience.....	358
Remote Desktop Services PowerShell module and Best Practices Analyzer	358
Planning to deploy remote desktop services	358
Installing and configuring remote desktop services.....	359
Installing and configuring Remote Desktop Session Host	359
Installing and configuring Remote Desktop Licensing.....	372
Installing and configuring Remote Desktop Web Access	374

Installing and configuring Remote Desktop Gateway	377
Overview of Remote Desktop Virtualization Host	384
Planning for a VDI deployment	386
Installing and configuring Remote Desktop Virtualization Host, Connection Broker, and Session Host for VDI.....	387
Summary	398
CHAPTER 9 Windows Server 2008 R2 high-availability and recovery features	399
Introduction to high availability	399
Failover Clusters.....	400
Network Load Balancing Clusters.....	400
New high-availability and recovery features.....	402
Failover Cluster PowerShell support	402
Cluster-Shared Volumes.....	403
Improved Cluster Validation.....	403
Support for additional cluster aware services	403
Ability to backup individual files and folders	403
Planning for high availability	404
Understanding how Failover Clustering works	405
Planning for a Failover Cluster.....	406
Installing and administering Failover Clustering	407
Failover Clustering prerequisites	408
Adding Failover Clustering feature	410
Configuring server networks.....	411
Connecting cluster nodes to shared storage	412
Verifying cluster configuration using the Cluster Validation Wizard.....	422
Creating a new Failover Cluster.....	425
Administering a Failover Cluster.....	437
Installing and administering Network Load Balancing	441
Network Load Balancing prerequisites.....	442
Adding Network Load Balancing feature.....	442
Creating a Network Load Balancing cluster	442
Adding an additional node to the NLB cluster.....	448
Planning for backups and disaster recovery.....	449
Disaster recovery planning.....	449
Backups.....	450
Installing and administering Windows backup	452
Installing windows server backup.....	452

Creating and managing backup jobs.....	453
Summary	459
CHAPTER 10 Securing Windows Server 2008 R2.....	461
AppLocker	462
Enabling AppLocker	463
Configuring AppLocker	464
Server Core	473
BitLocker	475
Preparing for BitLocker	476
Managing BitLocker.....	478
Security Configuration Wizard	483
Best practice analyzer	486
BPA from PowerShell.....	489
Auditing	491
Encrypting file system.....	496
EFS keys and algorithms	498
Cipher.exe	499
File classification infrastructure.....	501
Planning for FCI.....	502
Configuring FCI	503
Managing FCI.....	507
Read-only domain controller	508
Network policy and access services	511
NPS	514
NAP.....	515
Active directory recycle bin.....	521
Enabling the Active Directory Recycle Bin.....	522
Restoring deleted Active Directory objects.....	524
DirectAccess	527
DirectAccess infrastructure requirements.....	528
DirectAccess protocols.....	529
Selecting a DirectAccess model	529
Summary	531
CHAPTER 11 PowerShell V2 feature focus.....	533
Introduction to powershell	533
What is new in PowerShell V2	534
Installing powershell	536
Introduction to powershell scripting.....	537
Windows server 2008 R2 powershell cmdlets	539

Active Directory cmdlets	539
AppLocker cmdlets	549
Failover Cluster cmdlets	554
Group Policy cmdlets	559
Server Manager cmdlets	564
Windows Server Backup cmdlets	567
Summary	573
CHAPTER 12 Windows Server 2008 R2 monitoring and troubleshooting	577
Performance monitoring	577
Understanding Performance Monitor	577
Using task manager and resource monitor	583
Task Manager	583
Resource Monitor	585
Event Viewer	586
Applications and Services Logs	592
Data Collector Sets	594
Windows memory diagnostic	598
System Center Operations Manager 2007 R2	598
Summary	600
CHAPTER 13 Windows Server 2008 R2 and Windows 7	603
Overview of BranchCache	603
Planning to deploy BranchCache	605
Deployment options	605
Prerequisites	607
Designing a BranchCache deployment	607
Deploying BranchCache	608
Overview of DirectAccess	623
Planning to deploy DirectAccess	626
DirectAccess Requirements	627
Designing your DirectAccess deployment	629
Determining which access model to deploy	630
Planning for network firewall configuration	631
Designing your DirectAccess server layout	631
Deploying DirectAccess	632
Creating a certificate template for computer autoenrollment	633
Removing ISATAP from DNS global block list	633
Creating a certificate revocation list (CRL) distribution point on the DirectAccess server	634

Installing and configuring DirectAccess and network location server.....	646
Summary	651
CHAPTER 14 Windows Server 2008 R2 delta changes	653
Networking changes	653
DirectAccess	653
BranchCache	654
VPN Reconnect	655
DNS cache locking.....	655
DNS Security Extensions.....	655
Firewall profiles per network connection.....	656
Active directory changes.....	656
Active Directory Recycle Bin.....	656
Offline domain join	656
Active Directory Best Practices Analyzer.....	658
Active Directory Web Services	660
Managed service accounts.....	660
Active Directory Administrative Center.....	662
Active Directory Module for PowerShell.....	663
Read-only SYSVOL for Read-Only Domain Controllers.....	663
File and print services changes.....	663
Read-only DFSR Replicas	664
File classification infrastructure.....	664
Print driver isolation.....	664
Network scanner management	664
Internet information server changes	665
Request filtering module	665
Best Practices Analyzer.....	665
PowerShell module.....	665
Support for managed service accounts	665
Hostable Web core	666
.NET support on server core installs	666
Hyper-V changes	666
Live Migration.....	666
Processor enhancements	668
Storage enhancements	668
Remote desktop services (formerly known as terminal services) changes.....	668
Remote desktop session host	669
Remote desktop virtualization host	670

RemoteApp and desktop connection	670
Remote Desktop Connection Broker	671
Remote Desktop Gateway	671
Remote Desktop Web Access	672
Remote Desktop client experience	673
Remote desktop services PowerShell module and Best Practices Analyzer	673
High availability and recovery changes	673
Failover Cluster PowerShell support	673
Cluster shared volumes	674
Improved cluster validation	674
Support for additional cluster aware services	674
Ability to backup individual files and folders	674
Security changes	675
DNSSEC support	675
AppLocker	675
Changes to network access protection	675
Managed service accounts	676
New security auditing features	676
Powershell changes	677
Integrated scripting environment and debugger	677
Background jobs	677
Transactions	677
Cmdlets for server administration	677
Summary	678
Index	679

About the Author

LEAD AUTHOR

Dustin Hannifin (Microsoft MVP—Office Communications Server) is a systems engineer with expertise in various Microsoft technologies, including SharePoint Server, Office Communications Server, Exchange Server, Active Directory, and System Center Operations Manager. He currently works on projects related to unified communications, collaboration, systems management, and virtualization. Dustin regularly contributes to his blog (www.technotesblog.com) and other technology communities, including leading the Northern Indiana Microsoft User Group and the Microsoft Unified Communications *Virtual* User Group (www.ucvug.org). Dustin holds a bachelor's degree from Tennessee Technological University. Dustin, a Tennessee native, currently resides in South Bend, IN.

CONTRIBUTORS

Joey Alpern currently works as an independent consultant specializing in web development and database component integration. Since the start of his technical career, he has worked in various industries, ranging from the creation of internal systems for technical staffing agencies to dotcom start-ups, with his most recent adventure occurring in the luxury cruise industry. Joey holds a Bachelor of Science in Computer Science from Florida International University. With over 13 years of development and coding experience, he is comfortable with multiple languages, including C++, Java, Visual Basic, .Net, and even Pascal. Additionally, he is Java certified and often prefers working with computers rather than people.

Naomi J. Alpern currently works for Microsoft Consulting Services as a senior consultant specializing in unified communications and IT architecture and planning. Naomi engages face-to-face with Microsoft business customers, assisting them in the successful planning and deployment of Microsoft products. Since the start of her technical career, she has worked in many facets of the technology world, including IT administration, technical training, and, most recently, full-time consulting. Naomi holds a Bachelor of Science in Leisure Services Management from Florida International University. Additionally, she holds many Microsoft certifications, including an MCSE and MCT, as well as other industry certifications such as Citrix Certified Enterprise Administrator, Security+, Network+, and A+. Naomi lives in Charlotte, NC, where she spends her spare time along with her husband, Joey, chasing after their two young sons, Darien, 5, and Justin, 2. On the odd occasion that she runs into some alone time, she enjoys curling up with a cheesy horror or mystery novel for company.

TECHNICAL EDITOR

Aaron Tiensivu has more than 15 years' experience in the IT industry. He is a Microsoft MVP and SME for numerous Microsoft projects, including books, certification exams, and white papers. Aaron likes to keep up-to-date on all the latest products and betas. His current

passions are Windows 7 and Server 2008 R2, Exchange 2010, Office Communications Server 2007 R2, and Windows Mobile 6.5 devices. His Microsoft-centric blog has been featured in the *Detroit Free Press* and other various media outlets.

Acknowledgments

This being the first book of mine as a primary author, I feel the need to thank those who helped make this possible for me. I first thank my parents and family for always supporting me and encouraging me to strive for the best, even when they do not understand the work that I am doing. I also thank Gary Byrne for keeping me on track and giving me encouragement when I most needed it. Thanks to all the great folks at Syngress for believing that I would make a decent author. Special thanks to Aaron Tiensivu for making sure that the content was technically correct (and providing some great suggestions along the way). Thanks to Naomi and Joey Alpern for writing two really tough chapters in this book. A big “thank you” to the GCC Tech Ops team (Ed, Jason, and Justin) for always encouraging and inspiring me. You guys rock! Thanks to my manager, John Pozivilko, for understanding those mornings when I walked into work late after spending most of the night writing. I also thank Carolyn Blanding for reviewing every chapter and giving me awesome feedback. Thanks to all of my friends, colleagues, and mentors whom I failed to mention. You inspire me to give it my all every day! I thank my creator and my God, who never ceases to bless me, even when I am so undeserving.

Dustin Hannifin, March 2010