



POWERSHELL 7

FOR IT PROFESSIONALS

THOMAS LEE

WILEY

PowerShell 7 for IT Pros



PowerShell 7 for IT Pros

A Guide to Using PowerShell 7 to Manage
Windows® Systems

Thomas Lee

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PowerShell 7 for IT Pros

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To my wife, Susan, who has been my loving companion and a constant source of strength, affection, and humour, especially during the COVID-19 crisis.

To my daughter, Rebecca. Your smiles keep me going.

To my grandmother, Louise Runk Robinson, who worked in the US Library of Congress and lit a spark in me that would ultimately lead me to write books.

To my friend, Jeffrey Snover, who has been an inspiring role model.

Thank you all for your support. You mean the world to me.



About the Author



Thomas Lee is a technical trainer, consultant, and author who specializes in the Microsoft Windows platform. Thomas began in the IT industry in 1968 as a computer operator operating an IBM 360/67 running IBM's Time-Sharing System. His career spans five decades and has included the mainframe, mini-computers, time sharing (aka very early cloud computing), AI, and other emerging technologies.

Thomas has worked in the consulting field, first with Arthur Andersen (today known as Accenture), where he witnessed the birth of the PC as a tool for clients across the board. He continues to provide consulting services to many long-standing clients.

He has also written extensively, both for the technical trade in the United Kingdom and for the worldwide publishing industry. This book marks his fourth on PowerShell. He has written hundreds of articles about Microsoft and other technologies and maintains a technical blog at tf109.blogspot.com.

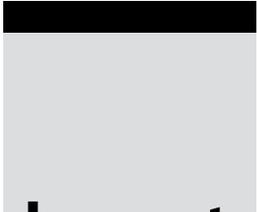
Thomas was a Microsoft-certified trainer for more than 25 years and was awarded the Microsoft MVP award 17 times. He was a fellow in the British Computer Society and a chartered engineer. He serves as a global board member for the MVP Reconnect program.

He lives today in an old cottage in the English countryside. He enjoys his garden, a well-stocked wine cellar, an extensive collection of Grateful Dead live recordings, and the love of his family. He loves working with PowerShell too!



About the Technical Editor

Jim Topp is a Windows Server systems administrator with more than 16 years of experience. He has been scripting and automating with PowerShell for more than 12 years. He is a community member of PowerShell.org and has edited several books written by Don Jones. Jim lives in Bloomington, Indiana.



Acknowledgments

Every book requires a great team of talented people to ensure a great product. While an author can write text and code, the developmental and technical editors focus the writing and ensure that the scripts are accurate and work as shown. Publishing a book is an honour as well as an incredible learning experience for me. I have always believed that you truly have to know your subject to write a book, and I certainly have learned a lot in the process.

First, my deepest gratitude to Wiley, and the fantastic team at Wiley, for bringing this book to life: Kenyon Brown, Pete Gaughan, and others. Thank you for recognizing that I had a story to tell.

A huge thank-you to my developmental editor, Jim Compton, for your wisdom, kindness, and patience during through my writing “process.” You have been a great inspiration to me, and I am indebted for your contributions.

Writing hundreds of lines of PowerShell 7 code and transcribing it accurately into both the book’s text and the screenshots is an amazingly difficult job. Jim Topp did an outstanding job of checking every line of code and every screenshot as well as making great suggestions to improve what we have here.

In writing this book, I have been impressed on a daily basis with the entire PowerShell development team. You folks have delivered high-quality code consistently, been able to listen to and accept the views of the community, and deliver a world-class product. Joey Aiello, Steve Lee, and Jim Truher, among others, have been an inspiration.

Another significant inspiration is Jeffrey Snover. From that day in L.A. when he first introduced Monad, he has been an awesome role model. He is smart, focused, and one of the best presenters I have ever had the good fortune to watch. When I noted, on Twitter, that PowerShell Core 6.1 was kind of like Windows PowerShell 2.0 all over again, Jeffrey noted in his understated way that, while it was true, PowerShell had better velocity. An understatement at the very least.

The PowerShell 7 code in this book was developed and tested on a variety of Hyper-V virtual machines running Windows Server 2019. Because I am a member of the MVP Reconnect program, the Visual Studio team at Microsoft generously provided me with a subscription to Visual Studio Online, from which I obtained the necessary ISO images with which you (and I) can build the VMs. I could not have written this book without their generous assistance.

Thanks too to the PowerShell community. The community has created a massive number of PowerShell resources, code, and documentation. Deep dives, new modules, tips, and tricks—so much awesome content. Thanks to Jeff Hick, Don Jones, Richard Siddaway, and many more.

Lastly, a shout-out to the PowerShell community at Spiceworks—a friendly bunch of helpful PowerShell addicts (community.spiceworks.com/programming/powershell). If you are keen on PowerShell, consider visiting and joining in.



Foreword

Ten years after the release of Windows PowerShell 1.0, the PowerShell team announced PowerShell Core 6. The work toward PowerShell Core 6 started a few years earlier, and that was when I became the engineering manager for PowerShell. It was not easy early on, particularly in terms of compatibility with Windows PowerShell, but with the PowerShell 7 release we are officially starting a new chapter for PowerShell in which PowerShell 7 can be used as a replacement for (or side by side with) Windows PowerShell 5.1.

PowerShell 7 represents the future of PowerShell based on three big changes:

- **A single automation language for Windows, Linux, and macOS:** Windows PowerShell has been heavily adopted by the Windows community. With IT moving toward the cloud, this presented an opportunity for PowerShell to be the glue language for the cloud. Improvements to the web cmdlets make it simple to call REST APIs. Early partnerships with Azure, Amazon Web Services, Google Compute Cloud, and VMware ensured PowerShell cmdlet coverage for any cloud you would want to use on any platform. Along the way, we also made PowerShell a great shell to use whether you are using Windows, Linux, or macOS.
- **Moving to open source:** This was a huge change in how we write software and also how we engage with the community. We could now be much more transparent with our plans and also accept contributions from the community to address issues or add features that would not have necessarily been a priority for the team. With about 50 percent of the pull requests coming from the community, PowerShell's future really is a community-driven project!

- **Early adopter of .NET Core:** It was not without challenges that we moved from .NET Framework to .NET Core (and now just .NET). Compatibility with Windows PowerShell modules was the biggest issue initially. .NET has come a long way in addressing the compatibility gap, adding back many APIs to enable PowerShell to be compatible with existing modules. In addition, .NET Core has substantial performance improvements that make existing PowerShell scripts and modules simply work faster without any modifications!

The mission statement of PowerShell is to make it easier for users to use compute resources. With PowerShell 7, this includes different platforms such as Windows, Linux, and macOS, but also new architectures such as ARM32 and ARM64. With PowerShell modules available for the major public and private clouds, you can leverage PowerShell to be more productive in cross-cloud or hybrid scenarios. We still maintain PowerShell’s “sacred vow”— that learning a new language is hard, but with time invested learning PowerShell, we will continue to enable PowerShell users to expand their impact and productivity, such as serverless functions as a service and Jupyter Notebooks. I’m excited about the next phase of PowerShell that we started with PowerShell 7, but for me, this is really just a beginning, with many more great things to come! This book from Thomas is a great way to get started on PowerShell 7, leveraging existing experience from Windows PowerShell.

Thomas Lee has been part of the PowerShell community far longer than I have been the engineering manager for PowerShell. Some of the things I’ve learned about PowerShell have come from reading his articles and blog posts. As the PowerShell team was making progress toward our substantial PowerShell 7 release, Thomas was there the whole way, promoting, teaching, and informing the community of all the great things to come with PowerShell 7. The most important aspect of what makes PowerShell successful has been the community, and Thomas has been a significant part of that.

Steve Lee
Principal Software Engineering Manager
PowerShell Team



Contents at a Glance

Foreword	xiii	
Introduction	xxxiii	
Chapter 1	Setting Up a PowerShell 7 Environment	1
Chapter 2	PowerShell 7 Compatibility with Windows PowerShell	37
Chapter 3	Managing Active Directory	55
Chapter 4	Managing Networking	111
Chapter 5	Managing Storage	145
Chapter 6	Managing Shared Data	191
Chapter 7	Managing Printing	231
Chapter 8	Managing Hyper-V	251
Chapter 9	Using WMI with CIM Cmdlets	315
Chapter 10	Reporting	357
Index	403	



Contents

Foreword	xiii
Introduction	xxxiii
Chapter 1 Setting Up a PowerShell 7 Environment	1
What Is New in PowerShell 7	2
Systems Used in This Book and Chapter	3
Server VM Build Scripts	4
VM Internet Access	4
Systems in Use for This Chapter	4
Installing PowerShell 7	5
Before You Start	6
Enabling the Execution Policy	6
Installing the Latest Version of NuGet and PowerShellGet	6
Creating the Foo Folder	7
Downloading the PowerShell 7 Installation Script	7
Viewing Installation File Help Information	8
Installing PowerShell 7	8
Examining the Installation Folder	9
Viewing Module Folder Locations	10
Viewing Profile File Locations	11
Starting PowerShell 7	12
Viewing New Locations for Module Folders	13
Viewing New Locations for Profile Files	13
Creating a Current User/Current Host Profile	14
Installing and Configuring VS Code	14
Before You Start	15
Downloading the VS Code Installation Script	15
Installing VS Code and Extensions	16
Creating a Sample Personal Profile File	17

Downloading the Cascadia Code Font	17
Installing the Cascadia Code Font in Windows	18
Updating VS Code User Settings	18
Creating a Shortcut to VS Code	19
Creating a Shortcut to the PowerShell 7 Console	19
Building Layout.XML	20
Importing the New Layout.XML File	20
Using the PowerShell Gallery	21
Before You Start	22
Discovering PowerShell Gallery Modules	22
Determining the Modules That Support .NET Core	23
Finding NTFS Modules	23
Installing the NTFS Security Module	24
Viewing Available Commands	24
Creating a Local PowerShellGet Repository	24
Before You Start	24
Creating the Repository Folder	25
Sharing the Repository Folder	26
Creating a Module Working Folder	26
Creating a Simple Module	26
Loading and Testing the Module	27
Creating a Module Manifest	27
Trusting the Repository	28
Viewing Configured Repositories	28
Publishing a Module	29
Viewing the Repository Folder	29
Finding a Module	30
Creating a Code-Signing Environment	30
Before You Start	31
Creating a Self-Signed Certificate	31
Viewing the Certificate	31
Creating a Simple Script	32
Setting Execution Policy	32
Attempting to Run the Script	32
Signing the Script	33
Copying a Certificate to the Trusted Publisher Certificate and Trusted Root Stores	33
Signing the Script Again	34
Running the Script	34
Testing the Script's Digital Signature	35
Summary	35
Chapter 2 PowerShell 7 Compatibility with Windows PowerShell	37
System Used in This Chapter	38
Examining PowerShell Modules	38
Understanding Module Types	39
Importing PowerShell Modules	40
Using PowerShell Module Manifests	41

	Module Naming	42
	Creating a Module with Multiple Versions	43
	Using Module Versions	44
	Using Module Autoload	46
	Viewing the Module Analysis Cache	47
	Introducing the Compatibility Solution	48
	Using the Module Load Deny List	50
	Things That Do Not Work with PowerShell 7	51
	Windows PowerShell Incompatibilities	51
	Compatibility Issue Work-Arounds	54
	Summary	54
Chapter 3	Managing Active Directory	55
	Systems Used in This Chapter	58
	Establishing a Forest Root Domain	60
	Before You Start	60
	Importing the Server Manager Module	60
	Installing the AD Domain Services Feature	61
	Loading the AD DS Deployment Module Explicitly	61
	Creating a Forest Root Domain Controller	62
	Restarting the Computer	63
	Viewing the Directory Server Entry (DSE)	63
	Viewing Details of the New AD DS Forest	64
	Getting Details of the Domain	65
	Viewing DNS Settings	65
	Installing a Replica DC	66
	Before You Start	67
	Importing the Server Manager Module	67
	Checking Network Connectivity	67
	Adding the AD DS Features on DC2	68
	Promoting DC2	69
	Rebooting DC2	69
	Reviewing DCs in Reskit.Org Domain	69
	Viewing the Reskit.Org Domain	70
	Installing a Child Domain	70
	Before You Start	71
	Importing the Server Manager Module	71
	Verifying That DC1 Can Be Resolved	71
	Adding the AD DS Features to UKDC1	72
	Creating the Child Domain	73
	Viewing the Updated AD Forest	73
	Viewing the Child Domain	74
	Configuring a Cross-Forest Trust	75
	Before You Start	76
	Importing the Server Manager Module	76
	Installing the AD Domain Services Feature and Management Tools	76

Testing Network Connectivity with DC1	77
Importing the AD DS Deployment Module	77
Promoting KAPDC1	78
View Kapoho.Com Forest Details	78
Adjusting the DNS to Resolve Reskit.Org from KAPDC1	79
Testing Conditional DNS Forwarding	80
Setting Up a Conditional Forwarder on Reskit.Org	80
Create Credentials to Run a Command on DC1	81
Setting WinRM	81
Invoking the Script Block on DC1	81
Getting the Domain Detail Objects	82
Viewing the Reskit Forest Details	83
Viewing the Kapoho Forest Details	83
Establishing a Cross-Forest Trust	84
Creating a Script Block to Adjust the ACL of a File on DC1	84
Running the Script Block on DC1 to Demonstrate the Cross-Forest Trust	85
Managing AD Users, Computers, and OUs	86
Before You Start	87
Creating a Hash Table for General User Attributes	87
Creating Two Users	87
Creating an OU for IT	88
Moving Users into an OU	88
Creating a User in an OU	89
Adding Two Additional Users	89
Viewing Existing Users	90
Removing a User with a Get Remove Pattern	90
Removing a User Directly	91
Updating and Displaying a User Object	91
Creating an AD Group	92
Creating and Viewing Group Membership	93
Make a New Group for the IT Team	93
Make All Users in IT Members of the IT Team Group	94
Displaying Group Membership	94
Adding a Computer to the AD	95
Displaying Computers in an AD Domain	95
Adding Users to AD via a CSV	96
Before You Start	96
Creating a CSV File	97
Importing and Viewing the CSV	97
Adding Users to AD	98
Viewing All Users in Reskit.Org	98
Configuring Just Enough Administration (JEA)	100
Before You Start	101
Creating a Transcript Folder	101
Creating a Role Capabilities Folder	101

	Creating a Role Capabilities File	101
	Creating a JEA Session Configuration File	102
	Testing the Session Configuration File	103
	Enabling Remoting and Creating the JEA Session Endpoint	103
	Checking What the User Can Do	104
	Creating Credentials for JerryG	105
	Creating Three Script Blocks to Test JEA	105
	How Many Commands Exist in a JEA Session?	106
	Invoking a JEA-Defined Function	107
	Get the DNSServer Command Available in JEA Session	107
	Viewing the Transcripts Folder	107
	Examining a JEA Transcript	108
	Summary	109
Chapter 4	Managing Networking	111
	Systems Used in This Chapter	112
	Configuring IP Addressing	113
	Before You Start	114
	Checking Adapter Details	114
	Configuring an IP Address	115
	Verifying the New IP Address	115
	Setting DNS Server Details	116
	Validating the New IP Configuration	116
	Testing Network Connectivity	117
	Before You Start	117
	Verifying That SRV2 and Loopback Are Working	117
	Testing Connectivity to the DC	118
	Checking Connectivity to the SMB and LDAP Ports	119
	Examining the Path to a Remote Server	119
	Installing the DHCP Service	121
	Before You Start	121
	Installing the DHCP Feature	121
	Authorizing the DHCP Server in the AD	122
	Completing the DHCP Configuration	123
	Restarting the DHCP Service	123
	Checking the DHCP Service	123
	Configuring DHCP Scopes	124
	Before You Start	125
	Creating a DHCP Scope	125
	Getting Scopes from the DHCP Server	125
	Configuring Server-wide Options	126
	Configuring Scope-Specific Options	126
	Testing the DHCP Service in Operation	127
	Configuring DHCP Failover	128
	Before You Start	128
	Installing the DHCP Server Feature on DC2	128
	Letting DHCP Know It Is Fully Configured on DC2	129
	Authorizing the Second DHCP Server in AD	129

Viewing Authorized DHCP Servers	129
Configuring DHCP Failover and Load Balancing	130
Viewing Active Leases from Both DHCP Servers	131
Viewing DHCP Server Statistics	132
Configuring the DNS Service	133
Before You Start	134
Installing the DNS Feature on DC2	134
Configuring the DNS Service	135
Viewing Key DNS Server Options	136
Configuring DNS Zones and Resource Records	138
Before You Start	139
Creating a DNS Forward Lookup Zone	139
Creating a Reverse Lookup Zone	139
Registering DNS Records for DC1, DC2	140
Checking the DNS Zones on DC1	140
Adding DNS RR to the Cookham.Net Zone	141
Restarting the DNS Service	142
Checking the DNS RRs in the Cookham.Net Zone	142
Testing DNS Server Resolution	143
Summary	144
Chapter 5 Managing Storage	145
Systems Used in This Chapter	146
Managing Disks and Volumes	147
Before You Start	147
Getting Information about Physical Disks in SRV1	148
Initializing the New Disks	149
Viewing the Initialized Disks	149
Creating an F: Volume in Disk 1	150
Creating a Partition in Disk 2	150
Creating a Second Partition	151
Viewing Volumes on SRV1	151
Formatting G: and H:	152
Getting Partitions on SRV1	153
Getting Volumes on SRV1	154
Managing NTFS Permissions	154
Before You Start	155
Downloading and Installing the NTFS Security Module	155
Finding Commands in the NTFS Security Module	156
Creating a New Folder and File	157
Viewing the Default Folder ACL	157
Viewing the Default ACL on File	158
Creating the Sales Group	159
Displaying the Sales Group	159
Adding Full Control for Domain Admins	160
Removing the Default File ACE	160
Removing a Folder's Inherited Rights	161
Adding Sales Group Access to the Folder	161

Viewing Permissions on the Folder	162
Viewing Permissions on the File	162
Managing Storage Replica	163
Before You Start	163
Creating Content on F:	165
Measuring the New Content	165
Checking Content on the Target	166
Adding the Storage Replica Feature to the Source	166
Restarting the Source	167
Adding Storage Replica to the Target	167
Restarting the Target	168
Testing the Configuration of SR	168
Viewing the Topology Test Report	169
Creating a Storage Replica Partnership	170
Viewing the Partnership	171
Examining Volumes on the Target	172
Reversing the Replication	173
Viewing Updated Replication Group Status	173
Examining SRV2 Volumes	174
Managing Filestore Quotas	175
Before You Start	175
Installing the FS Resource Manager Feature	175
Setting Up SMTP Settings for FSRM	176
Sending a Test Email	176
Creating an FSRM Quota Template	178
Viewing Available FSRM Quota Templates	178
Creating a New Folder	179
Building an FSRM Action	179
Create an FSRM Threshold	180
Building an FSRM Quota	180
Test the 85% Quota Threshold	181
Examining the FSRM Email	181
Testing the Hard Quota Limit	181
Viewing the Folder Contents	183
Managing File Screening	183
Before You Start	184
Examining Existing FSRM File Groups	184
Examining the Existing File Screen Templates	184
Creating a New File Folder	186
Creating a New File Screen	186
Testing File Screening	187
Setting Up an Active File Screen	187
Viewing Notification Limits	188
Changing Notification Limits	189
Testing the Active File Screen	189

Viewing Active File Screen Email	189
Summary	190
Chapter 6	191
Managing Shared Data	191
Systems Used in This Chapter	193
Setting Up and Securing an SMB File Server	194
Before You Start	194
Adding File Server Features to FS1	194
Getting SMB Server Settings	195
Ensuring That SMB1 Is Disabled	195
Enabling SMB Signing and SMB Encryption	197
Disabling Default Shares	197
Turning Off Server Announcements	198
Restarting the SMB Server Service	198
Reviewing the Updated SMB Server Configuration	198
Creating and Securing SMB Shares	198
Before You Start	199
Setting Up FS1	200
Discovering Existing SMB Shares	200
Creating an SMB Share	200
Setting a Share Description	201
Setting the Folder Enumeration Mode	201
Requiring Encryption for a Share	201
Removing All Access to Sales1 Share	202
Adding Reskit\Domain Admins to the Share	202
Adding System Full Access	203
Giving the Creator/Owner Full Access	203
Granting the Sales Group Access	203
Reviewing Share Access	204
Reviewing the NTFS Permissions	204
Setting the NTFS ACL to Match the Share	205
Removing NTFS Inheritance	205
Viewing the Folder ACL	206
Creating and Using an iSCSI Target	207
Before You Start	208
Installing the iSCSI Target Feature on SRV2	209
Exploring iSCSI Target Server Settings	210
Creating a Folder on SRV2	210
Creating an iSCSI Virtual Disk	211
Creating the iSCSI Target on SRV2	212
Creating iSCSI Disk Target Mapping on SRV2	213
Configuring the iSCSI Service on SRV2	213
Setting Up the iSCSI Portal	213
Viewing the SalesTarget iSCSI Disk	214
Connecting to the Target on SRV2	215
Viewing the iSCSI Virtual Disk	216
Setting the Disk Online and Making It Read/Write	216

Creating a Volume on FS1	216
Using the iSCSI Drive on FS1	217
Setting Up a Clustered Scale-Out File Server	218
Before You Start	218
Setting Up the iSCSI Portal for FS2	219
Configuring the iSCSI Portal for FS2	219
Adding the File Server Role to FS2	221
Adding Clustering Features to FS1/FS2	221
Restarting FS1 and FS2	222
Testing the Cluster Nodes	222
Viewing Cluster Validation Test Results	222
Creating the Cluster	224
Configuring a Quorum Share on DC1	224
Setting the Cluster Witness	225
Ensuring that iSCSI Disks Are Connected	225
Adding the iSCSI Disk to the Cluster	225
Moving the iSCSI Disk into the CSV	226
Adding the SOFS Role to the Cluster	226
Creating a Folder	227
Adding a Continuously Available Share	227
Viewing Shares from FS1	228
Summary	229
Chapter 7	
Managing Printing	231
Systems Used in This Chapter	232
Installing and Sharing Printers	233
Before You Start	234
Installing the Print Server Feature on PSRV	234
Creating a Folder for the Print Drivers	235
Downloading Printer Drivers	235
Expanding the ZIP File	235
Installing the Drivers	236
Adding a New Printer Port	236
Adding a New Printer	237
Sharing the Printer	237
Reviewing the Printer Configuration	237
Publishing a Printer in AD	238
Before You Start	238
Getting the Printer Object	239
Checking the Initial Publication Status	239
Publishing the Printer to AD	239
Viewing the Printer Publication Status	240
Changing the Spool Folder	240
Before You Start	241
Loading the System.Printing Namespace	241
Displaying the Initial Spool Folder	241
Defining Required Permissions	242

Creating a Print Server Object	242
Creating a New Spool Folder	242
Changing the Spool Folder Path	242
Committing the Change	243
Restarting the Spooler Service	243
Reviewing the Spooler Folder	243
Creating Another Spool Folder	244
Stopping the Spooler Service	244
Configuring the New Spool Folder	244
Restarting the Spooler	244
Viewing the Results	245
Printing a Test Page	245
Before You Start	245
Getting Printer Objects from WMI	246
Displaying the Number of Printers Defined	246
Getting the Sales Group Printer WMI Object	246
Display the Printer's Details	247
Printing a Test Page	247
Creating a Printer Pool	248
Before You Start	248
Adding a Printer Port	248
Creating the Printer Pool for SalesPrinter1	248
Viewing Resulting Details	249
Summary	249
Chapter 8 Managing Hyper-V	251
Systems Used in This Chapter	253
Installing and Configuring Hyper-V	254
Before You Start	254
Installing the Hyper-V Feature on HV1	255
Rebooting HV1	255
Creating Folders to Hold VM Disks and VM Details	255
Building a Configuration Hash Table	256
Reviewing Key VM Host Settings	256
Creating a Hyper-V VM	257
Before You Start	257
Creating Variables	257
Verifying That the ISO Image Exists	258
Importing the DISM Module	258
Mounting the ISO Image	259
Viewing ISO Image Contents	259
Creating a New VM in HV1	260
Creating a VHDX File for the VM	260
Adding the VHD to the VM	261
Adding the ISO Image to the VM	261
Starting the VM	261
Installing Windows Server 2019	261

Viewing the Results	262
Using PowerShell Direct	262
Before You Start	262
Creating Variables for Use in This Section	262
Displaying Details of HVDDirect VM	263
Invoking a Command using VMName	263
Invoking a Command Based on VM ID	264
Configuring VM Networking	265
Before You Start	265
Getting Virtual NIC Details from HVDDirect	265
Creating a Credential for the VM	266
Getting NIC Details	266
Creating a Virtual Switch	267
Connecting the VM to the Switch	267
Enabling MAC Spoofing	268
Viewing VM Network Information	268
Viewing IP Address Inside HVDDirect	268
Joining the Reskit Domain	269
Rebooting the VM	270
Getting the Host Name of the HVDDirect VM	271
Configuring VM Hardware	271
Before You Start	272
Turning Off the HVDDirect VM	272
Setting the Hardware Startup Order	273
Setting Socket Count	273
Setting VM Memory	274
Adding an SCSI Controller	275
Restarting the VM	275
Creating a New Virtual Disk	275
Adding a Disk to a VM	276
Viewing SCSI Disks inside HVDDirect	277
Implementing Nested Virtualization	277
Before You Start	277
Stopping HVDDirect VM	277
Configuring Virtual Processor	278
Enabling MAC Address Spoofing	278
Restarting the VM	279
Creating Credentials	279
Installing Hyper-V in HVDDirect VM	280
Restarting the VM	280
Checking Hyper-V in HVDDirect	281
Using VM Checkpoints	282
Before You Start	282
Creating Credentials	283
Examining C: in the HVDDirect VM	283
Creating a Checkpoint	284

Examining the Checkpoint Files	284
Creating Content in HVDirect	285
Taking a Second Checkpoint	286
Viewing Checkpoint Details for HVDirect	286
Examining Files Supporting Checkpoints	286
Creating Another File in HVDirect	287
Reverting to Checkpoint1	287
Viewing VM Files	288
Rolling Forward to Checkpoint2	289
Viewing VM Files After Rolling Forward	289
Viewing Checkpoints in the VM	290
Removing Checkpoints	291
Checking VM Data Files after Removing Checkpoints	291
Using VM Replication	291
Before You Start	292
Configuring HV1 and HV2 for Delegation	293
Rebooting HV1 and HV2	294
Setting VMReplication	294
Enabling Replication from the Source VM	294
Viewing VM Replication Status	295
Viewing VM Status	296
Initiating Replication	296
Examining Initial Replication State	296
Viewing Replication	297
Testing Replica Failover	297
Viewing VM Status on HV2 after Failover	298
Getting VM Details from HV1	298
Getting VM Details from HV2	299
Stopping the Failover Test	300
Viewing VM Status	301
Setting Failover IP Address for VM Failover	301
Stopping HVDirect on HV1	302
Starting Failover from HV1 to HV2	302
Completing the Failover of HVDirect	303
Starting the Failover VM	303
Checking VM Status After Failover	303
Testing Failover VM Networking	304
Managing VM Movement	305
Before You Start	305
Viewing the HVDirect VM	305
Getting VM Configuration Location	306
Getting VM Hard Drive Locations	306
Migrating VM Storage	307
Viewing Configuration Details	307
Viewing VMs on HV2	308
Enabling VM Migration	308