



P r o f e s s i o n a l E x p e r t i s e D i s t i l l e d

Windows PowerShell 4.0 for .NET Developers

A fast-paced PowerShell guide, enabling you to efficiently administer and maintain your development environment

Sherif Talaat

[PACKT] enterprise 
PUBLISHING professional expertise distilled

Windows PowerShell 4.0 for .NET Developers

A fast-paced PowerShell guide, enabling you
to efficiently administer and maintain your
development environment

Sherif Talaat



BIRMINGHAM - MUMBAI

Windows PowerShell 4.0 for .NET Developers

Copyright © 2014 Packt Publishing

All rights reserved. No part of this book may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, without the prior written permission of the publisher, except in the case of brief quotations embedded in critical articles or reviews.

Every effort has been made in the preparation of this book to ensure the accuracy of the information presented. However, the information contained in this book is sold without warranty, either express or implied. Neither the author, nor Packt Publishing, and its dealers and distributors will be held liable for any damages caused or alleged to be caused directly or indirectly by this book.

Packt Publishing has endeavored to provide trademark information about all of the companies and products mentioned in this book by the appropriate use of capitals. However, Packt Publishing cannot guarantee the accuracy of this information.

First published: January 2014

Production Reference: 1080114

Published by Packt Publishing Ltd.

Livery Place
35 Livery Street
Birmingham B3 2PB, UK.

ISBN 978-1-84968-876-5

www.packtpub.com

Cover Image by Suresh Mogre (suresh.mogre.99@gmail.com)

Credits

Author

Sherif Talaat

Project Coordinator

Ankita Goenka

Reviewers

Mark Andrews

Mahmoud El-bagoury

Hosam Kamel

Shay Levy

Proofreader

Lawrence A. Herman

Indexer

Tejal Soni

Acquisition Editor

Vinay Argekar

Production Coordinator

Sushma Redkar

Lead Technical Editor

Deepika Singh

Cover Work

Sushma Redkar

Technical Editors

Iram Malik

Veena Pagare

Copy Editors

Janbal Dharmaraj

Sayanee Mukherjee

Alfida Paiva

About the Author

Sherif Talaat is a young Computer Science addict. He holds many technology certificates. Sherif is working in the ICT industry since 2005; he used to work on Microsoft's core infrastructure platforms and solutions, with more focus on IT process automation and scripting techniques.

Sherif is one of the early adopters of Windows PowerShell in the Middle East and Africa. He speaks about Windows PowerShell at technical events and user groups' gatherings. He is the founder of *Egypt PowerShell User Group* (<http://egpsug.org>) and the author of the first and only Arabic PowerShell blog (<http://arabianpowershell.wordpress.com>). He has been awarded the Microsoft **Most Valuable Professional (MVP)** for PowerShell five times in a row since 2009.

You may also catch him at sheriftalaat.com and follow him on Twitter @SherifTalaat.

He is also the author of *PowerShell 3.0: Advanced Administration Handbook*, Packt Publishing.

Acknowledgments

I would like to take this chance to dedicate this book to the soul of my dad and to thank my mom for her love, encouragement, and prayers.

To Israa, the best wife and friend in the world, thanks for your love, support, and patience during the long days and nights I have spent writing this book. I could not have done this without you.

To my dear son Yahia, your little smile gives me the strength and power to do something that will make you proud of your dad. Keep it up, my son, this smile brightens up my life.

To my old friend Refaat Issa and my friends in Redmond from the PowerShell team, Dan Harman, Hemant Mahawar, and Indhu Sivaramakrishnan, thanks for your feedback, comments, and advice during the preparation phase. It helped me a lot in building strong content for this book.

To my mentor, Prof. Ahmed Bahaa, a special thanks for the time and effort you invested in helping me write the tremendous chapter for ALM and TFS.

To Shay Levy, having you as a reviewer was enough to make me feel comfortable while writing this book. Your comments and feedback have a great impact on the quality of the content.

Last but not least, thank you, Packt Publishing, for giving me the opportunity to work with you again. I'd also like to thank every team member who contributed to this project. To the external reviewers and the other guys whom I didn't meet—your contribution is invaluable, and this book wouldn't be what it is without you.

About the Reviewers

Mark Andrews' career in technology has been a varied one. Over the last 18 years, he has held several different positions ranging from customer service to quality assurance. In all of these positions, the responsibility for configuration management and build management has always fallen on Mark either personally or through one of the groups that he managed. Because of his "keeping a hand in" management style, he has been involved closely with the scripting and automation framework for this area. Creating scripted frameworks that intercommunicate across machines, operating systems, or domain boundaries is a passion for him.

Mahmoud El-bagoury is a Senior Web/Cloud Computing Developer. He is an MCSD and MCTS. He has been working in the ICT industry since 2005. He used to work with Ford Motors, US and Compuware, US as an Azure Cloud Solution Developer and Architect with the main focus on Azure deployment and automation process, Azure Cloud security, and developing SmartCloud-based web apps (SaaS).

He is one of the early adopters of Windows Azure in the Middle East and Africa. Also, he is among the rare developers in the world who use open source Apache SolrCloud solutions for Big Data search engine with Azure PaaS and Microsoft PowerSell.

Hosam Kamel is currently a Regional Technology Solution Professional working for MEA Center Of Expertise, specializing in Visual Studio **Application Lifecycle Management (ALM)** and Team Foundation Server. His main focus is helping software professionals and organizations build better applications and solutions using Microsoft Application Lifecycle Management technologies, practices, and tools. He works with development teams and helps them eliminate traditional silos between development, testing, and project management to establish cohesive processes with the Visual Studio ALM tools. His experience with Team Foundation Server and Visual Studio started with the beginning of the VSTS and its product family, nearly seven years ago.

He is also an active Visual Studio ALM Ranger with contributions to many projects. He has also authored several articles and spoken at various user groups, events, and conferences. You can find him sharing his experience on his technical blog at <http://blogs.msdn.com/hkamel> and on Twitter with his handler @HosamKamel.

Shay Levy works as a Systems Engineer for a government institute in Israel. He has over 20 years' experience, focusing on Microsoft server platforms, especially on Exchange and Active Directory.

He is a worldwide-known, knowledgeable figure in the PowerShell scripting arena, and is very active on forums and user-group sessions. He is a **Microsoft Certified Trainer (MCT)** at the John Bryce training center, and for his contribution to the community he has been awarded the Microsoft **Most Valuable Professional (MVP)** award for six years in a row.

He is the co-founder and the editor of the PowerShellMagazine.com website, and as a long time PowerShell community supporter he also moderates multiple PowerShell forums, including the official Microsoft PowerShell forum and The Official Scripting Guys Forum on Microsoft TechNet.

He often covers PowerShell related topics on his blog at <http://PowerShay.com>, and you can follow him on Twitter at <http://twitter.com/ShayLevy>.

Shay was also the technical reviewer of the best-selling PowerShell book, *Microsoft Exchange 2010 PowerShell Cookbook* by Mike Pfeiffer, Packt Publishing.

www.PacktPub.com

Support files, eBooks, discount offers and more

You might want to visit www.PacktPub.com for support files and downloads related to your book.

Did you know that Packt offers eBook versions of every book published, with PDF and ePub files available? You can upgrade to the eBook version at www.PacktPub.com and as a print book customer, you are entitled to a discount on the eBook copy. Get in touch with us at service@packtpub.com for more details.

At www.PacktPub.com, you can also read a collection of free technical articles, sign up for a range of free newsletters and receive exclusive discounts and offers on Packt books and eBooks.



<http://PacktLib.PacktPub.com>

Do you need instant solutions to your IT questions? PacktLib is Packt's online digital book library. Here, you can access, read and search across Packt's entire library of books.

Why Subscribe?

- Fully searchable across every book published by Packt
- Copy and paste, print and bookmark content
- On demand and accessible via web browser.

Free Access for Packt account holders

If you have an account with Packt at www.PacktPub.com, you can use this to access PacktLib today and view nine entirely free books. Simply use your login credentials for immediate access.

Instant Updates on New Packt Books

Get notified! Find out when new books are published by following @PacktEnterprise on Twitter, or the *Packt Enterprise* Facebook page.

Table of Contents

Preface	1
Chapter 1: Getting Started with Windows PowerShell	7
Introducing Windows PowerShell	8
Windows PowerShell consoles	9
The Windows PowerShell console	10
The Integrated Scripting Environment (ISE)	10
The key features of Windows PowerShell	13
PowerShell fundamentals – back to basics	14
Working with objects	15
Understanding the piping and pipelines	16
Understanding and using aliases	17
Using variables and data types	18
Comparison and logical operators	19
Working with arrays and hash tables	20
Script flow and execution control	21
Conditional execution	21
Iterations statements	22
Using functions	23
Understanding providers and drives	24
Working with script files	25
Comments in PowerShell	26
Using help in Windows PowerShell	26
PowerShell's common parameters	29
Summary	30
Chapter 2: Unleashing Your Development Skills with PowerShell	31
Understanding CIM and WMI	32
CIM and WMI in Windows PowerShell	32
More reasons to adopt CIM	35

Working with XML	36
Loading XML files	36
Using the Get-Content cmdlet	36
Using the Select-Xml cmdlet	38
Importing and exporting XML files	39
Working with COM	39
Creating an instance of a COM object	40
Automating Internet Explorer with COM and PowerShell	40
Automating Microsoft Excel with COM and PowerShell	42
Working with .NET objects	44
Creating .NET objects	44
Extending .NET objects	45
Extending .NET framework types	46
Defining the object type using an inline C# class	46
Defining an object type using an assembly name or file	46
Understanding Windows PowerShell Modules	47
Creating Windows PowerShell Modules	48
The script modules	48
The binary modules	50
Creating your first binary module	50
The manifest modules	54
The dynamic modules	55
Script debugging and error handling	56
Working with breakpoints	57
Debugging your script	58
Error-handling techniques	59
The \$Error and \$LastExitCode variables	59
Building GUI with PowerShell	60
Summary	61
Chapter 3: PowerShell for Your Daily Administration Tasks	63
Windows PowerShell remoting	64
Four different ways of using remoting	64
Interactive remoting	64
Ad hoc remoting	65
Persistent session	65
Implicit remoting	66
Windows PowerShell Workflow (PSW)	67
Creating a workflow using PowerShell	68
Executing a PowerShell Workflow	68
Sequential execution	68
Parallel execution	69
InlineScript activity	70

Controlling the PowerShell workflow execution	71
Persistent workflows	73
Windows PowerShell in action	73
Working with Windows roles and features	73
Installing Windows roles and features	74
Uninstalling Windows roles and features	76
Managing local users and groups	76
Creating a new local user account	77
Modifying an existing local user account	78
Adding and removing a user account to and from a group	78
Listing all the existing users and groups	79
Managing web servers – IIS	80
Working with web application pools	80
Creating a new website	81
Creating a new virtual directory	82
Creating a new web application	82
Creating an FTP site	82
Creating and modifying an existing website binding	83
Backing up and restoring the web configuration	83
SQL Server and Windows PowerShell	84
Loading SQL Server PowerShell	85
Working with the SQL Server scripting	86
Summary	89
Chapter 4: PowerShell and Web Technologies	91
Web cmdlets in PowerShell	92
Working with web services	92
Example 1 – using the GeoIPService web service	92
Example 2 – using the Stock Quote web service	93
Working with web requests	94
Example 1 – downloading files from the Internet	96
Using REST APIs	97
Example 1 – finding YouTube videos using PowerShell	97
Example 2 – reading web feeds	99
Working with JSON	99
Example 1 – converting objects into the JSON format	100
Example 2 – converting objects from JSON to the PowerShell format	100
Summary	102
Chapter 5: PowerShell and Team Foundation Server	103
TFS Power Tools	103
Getting started with TFS PowerShell cmdlets	105
Working with TFS PowerShell cmdlets	107
Retrieving TFS information	107
Working with TFS items' information	108

Table of Contents

Managing TFS workspace	111
Managing changesets, shelvesets, and pending changes	112
Summary	115
Index	117

Preface

Windows PowerShell has been proven to be a strong automation tool that has various usages for IT professionals as well as developers. This object-based scripting language became part of many Microsoft servers and development tools. The enhanced .NET integration along with the new web cmdlets in Windows PowerShell 4.0 made it a developer-friendly tool.

Windows PowerShell 4.0 for .NET Developers comes with a set of easy-to-follow practical examples and real-world scenarios that will help you in getting started with PowerShell, understanding the syntax and grammar, building your scripts and modules, and integrating them with different technologies and tools.

This guide starts with the essential topics of PowerShell along with new features in PowerShell 4.0, then goes through building scripts and modules, and then goes deep into integration topics. Next, it covers PowerShell integration with .NET, WMI, and COM.

Moreover, we will use PowerShell to manage Windows Server, Internet Information Services, SQL Server, and Team Foundation Server. Finally, we will be working with XML and RESTful web services.

What this book covers

Chapter 1, Getting Started with Windows PowerShell, introduces us to Windows PowerShell and the new features in Version 4.0. It also introduces us to the difference between PowerShell, other command-line tools, and programming languages. Also, it covers the syntax fundamentals and grammar of the language.

Chapter 2, Unleashing Your Development Skills with PowerShell, demonstrates both simple and advanced examples of how to make use of PowerShell integration with technologies such as .NET, WMI, CIM, and COM. It also covers extending Windows PowerShell's capabilities for writing scripts and building modules.