

Contents

- About the Authorxv
- About the Technical Reviewerxvii
- Acknowledgmentsxix
- Introductionxxi
- Chapter 1: PowerShell Basics..... 1
 - What Is PowerShell? 1
 - Why Is PowerShell Important?..... 2
 - History of PowerShell Versions..... 3
 - Starting PowerShell..... 4
 - The Command Line Interface (CLI) 5
 - The Integrated Scripting Environment (ISE) 7
 - Enabling Scripting 8
 - Using the Integrated Scripting Environment 10
 - Encountering Script Errors 16
 - Summary 17
- Chapter 2: The PowerShell Language..... 19
 - Challenges to Learning PowerShell..... 19
 - Thinking Differently 19
 - Just Got to Get the Job Done 21
 - Getting Good Examples..... 21
 - The Paradox of Power..... 22

The PowerShell Language.....	22
A Brief Introduction Using a Script	22
Operators and Operands.....	25
Cmdlets.....	26
Variables	27
Cmdlet Output.....	28
Strings	29
Files	33
Control Flow.....	35
Script Blocks.....	39
Arrays	39
Associative Arrays	41
Summary.....	42
■ Chapter 3: Advanced Programming	43
Passing Parameters	43
Functions.....	48
It's All about Objects.....	51
A Real-World Use of PowerShell Objects for ETL	55
Remember the Pipeline.....	60
Pipelining Example: SQL Server Deployment	61
Formatting Output	65
Creating and Using COM Objects.....	70
Creating and Using .Net Objects.....	71
Waiting for a File	73
Summary.....	74

■ Chapter 4: Writing Scripts	75
Strict Mode.....	75
Error Handling	76
Using the Try/Catch Block.....	76
The Trap Statement	78
Using Try/Catch and the Trap Statement Together.....	80
Setting the \$ErrorActionPreference Preference Variable.....	85
Using the \$Error Variable and the ErrorAction Parameter	85
More on the \$Error Variable.....	87
Common cmdlet Parameters.....	88
Debugging	90
Events and Script Blocks: The Perfect Marriage	91
Using Windows Events.....	91
Using .NET Object Events	97
Using PowerShell Transactions	99
Conceptual Overview.....	99
An Example of How Transactions Should Work	100
Why Doesn't It Work?.....	103
Setting the Integrated Script Editor (ISE) Options.....	104
Summary.....	109
■ Chapter 5: Writing Reusable Code	111
CmdletBinding Arguments.....	111
SupportsShouldProcess.....	112
HelpURI	114
SupportsPaging	115
Validating Parameters	115
Validating a String	115
Validating a Number	116
Validating an Array.....	117
Using the ValidateScript Attribute	118

Default Parameter Values	122
Specifying a Default Parameter Value	122
Using \$PSDefaultParameterValues	123
Default Parameter Values When No Default Is Specified	125
Distinguishing Parameter Default Values from Intended Values.....	127
Validating Parameters the Old-Fashioned Way.....	132
Using Parameter Sets.....	133
Using Switch Parameters with Parameter Sets.....	136
ValueFromPipeline and ValueFromPipelineByPropertyName Attributes.....	137
Internationalization with the Data Section	139
Summary.....	143
■ Chapter 6: Extending PowerShell	145
The Four Types of Modules.....	145
Script Modules.....	145
Flexibility in Modules.....	155
Module Manifest.....	159
Dynamic Modules	161
Popular Free PowerShell Modules	163
OData PowerShell Explorer.....	164
PowerShell Community Extensions (PSCX)	164
ShowUI	166
SQL Server PowerShell Extensions	166
SQLISE	167
Windows Automation Snap-In (WASP).....	168
Summary	171
■ Chapter 7: Accessing SQL Server	173
About the Module	173
Using umd_database.....	173
How umd_database Works.....	176
Supporting Functions	180

Calling Stored Procedures	187
Summary	202
■ Chapter 8: Customizing the PowerShell Environment	203
PowerShell Variables	203
Automatic Variables	204
Preference Variables	220
Environment Variables	226
Using PS Drives	227
Aliases	229
Customizing the Console	230
Profiles	234
Summary	239
■ Chapter 9: Augmenting ETL Processes	241
The Functions	243
Wait for a File	243
Copy File	245
Unzip the File	246
Add the File Name to a Flat File	248
Move the Files	251
Send Email	252
Load the Files	255
Let's Process Some Files	258
More Useful ETL Functions	261
Data Validation	261
Combine Files	265
Add Column Headings	267
Securing Credentials	268
Send Secure Email	269
Summary	271

- **Chapter 10: Configurations, Best Practices, and Application Deployment..... 273**
 - Configuring PowerShell Applications 273
 - Using Environment Variables 273
 - PowerShell Variables Scope 275
 - A Simple Configuration Approach 280
 - A More Advanced Configuration Approach 281
 - Taking Configuration a Step Further 284
 - Storing Configuration Values in a SQL Server Table 287
 - Using a Script Module to Support Configuration 291
 - PowerShell Development Best Practices 293
 - Function Naming 293
 - File Naming 294
 - Make Code Reusable 295
 - Use Source Code Control 296
 - Build In Configurations from the Start 296
 - PowerShell Application Deployment..... 297
 - Deploying Script Modules..... 297
 - Deploying Script Files 299
 - Deploying Jobs 300
 - Summary..... 302
- **Chapter 11: PowerShell Versus SSIS 303**
 - Introduction 303
 - Advantages of PowerShell as an ETL Tool 303
 - Pre-Installed and Free 303
 - Supports Interaction 304
 - PowerShell Goes Where SSIS Can't..... 304
 - Reusability and Extensibility..... 304
 - Dynamic Code..... 304
 - Upgrades and Code Dependencies..... 305

Advantages of SSIS	305
Performance	305
Visual Development Interface	305
SQL Server Integration and Configuration	305
Built-In Components	306
The PowerShell ETL Framework	306
Mapping.....	307
The Northwind Company Use Case	321
The Products Table Load.....	323
The Order Table Load.....	328
The Customers Table	333
Packaging Up the ETL Job	337
Summary	338
■ Chapter 12: PowerShell Jobs	339
PowerShell Jobs.....	339
Running Background Jobs.....	341
Scheduled Jobs	346
Scripting with the Job Cmdlets	357
Using PowerShell with SQL Server Agent	360
Accessing SQL Server Agent Jobs from PowerShell	371
Summary	373
■ Chapter 13: PowerShell Workflows	375
PowerShell Remote Execution	375
Configuring Remote Execution	376
Using Remote Execution with Invoke-Command.....	377
Workflows	380
Parallel Execution	383
Sequence.....	385
Foreach –Parallel.....	386

- ETL Workflow..... 387
 - The Workflow Code..... 388
 - Calling the Workflow..... 392
 - Register the Events..... 395
 - Sending Mail..... 395
 - Workflow Creation Steps 396
- A Poor Man’s Hadoop 397
 - Setting Up the Poor Man’s Hadoop Workflow 397
 - Calling the Poor Man’s Hadoop Workflow 399
- Summary 400
- Index..... 401