CNT 4603: System Administration
Fall 2012

Scripting – Windows PowerShell – Part 3

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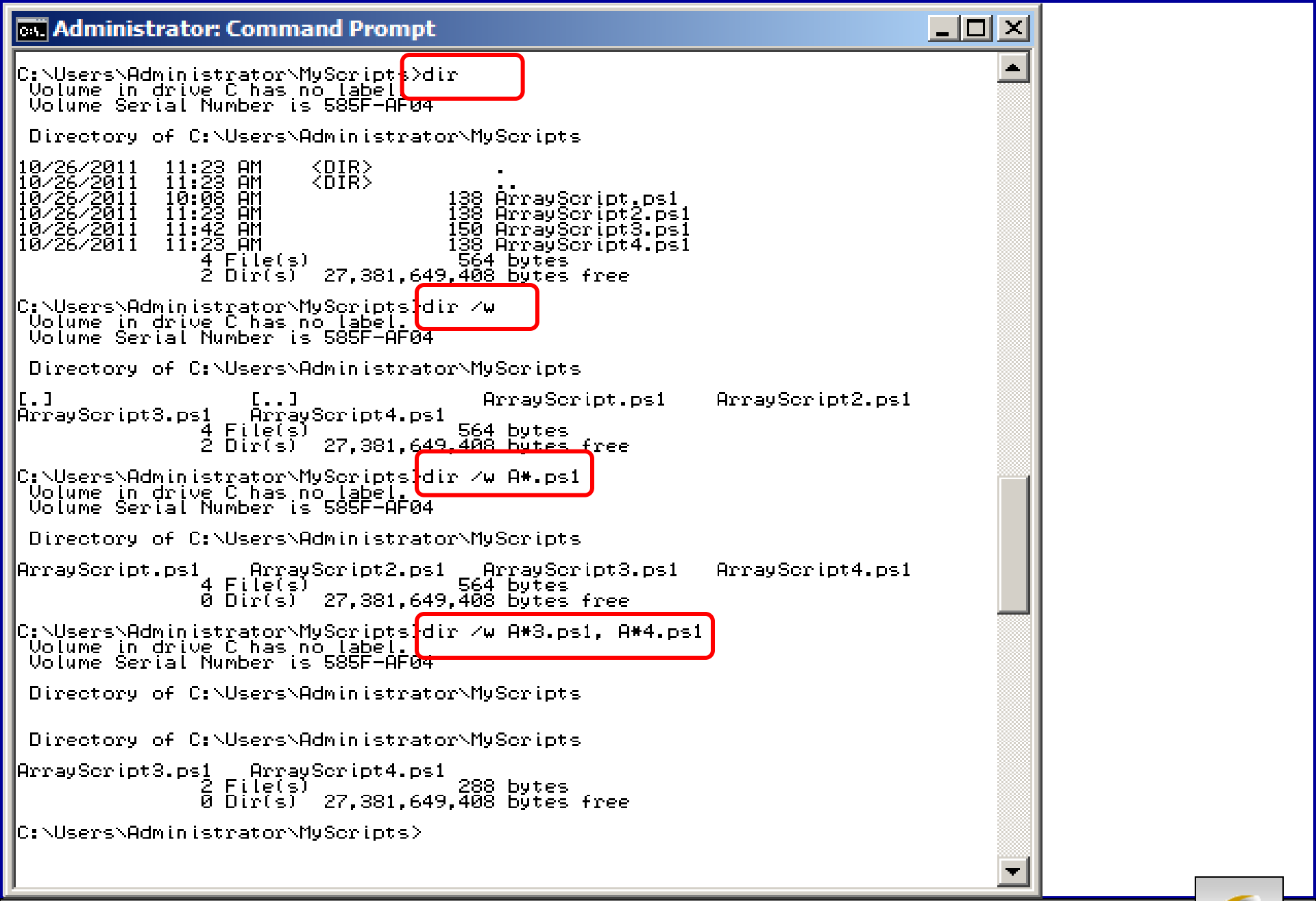
The PowerShell Environment

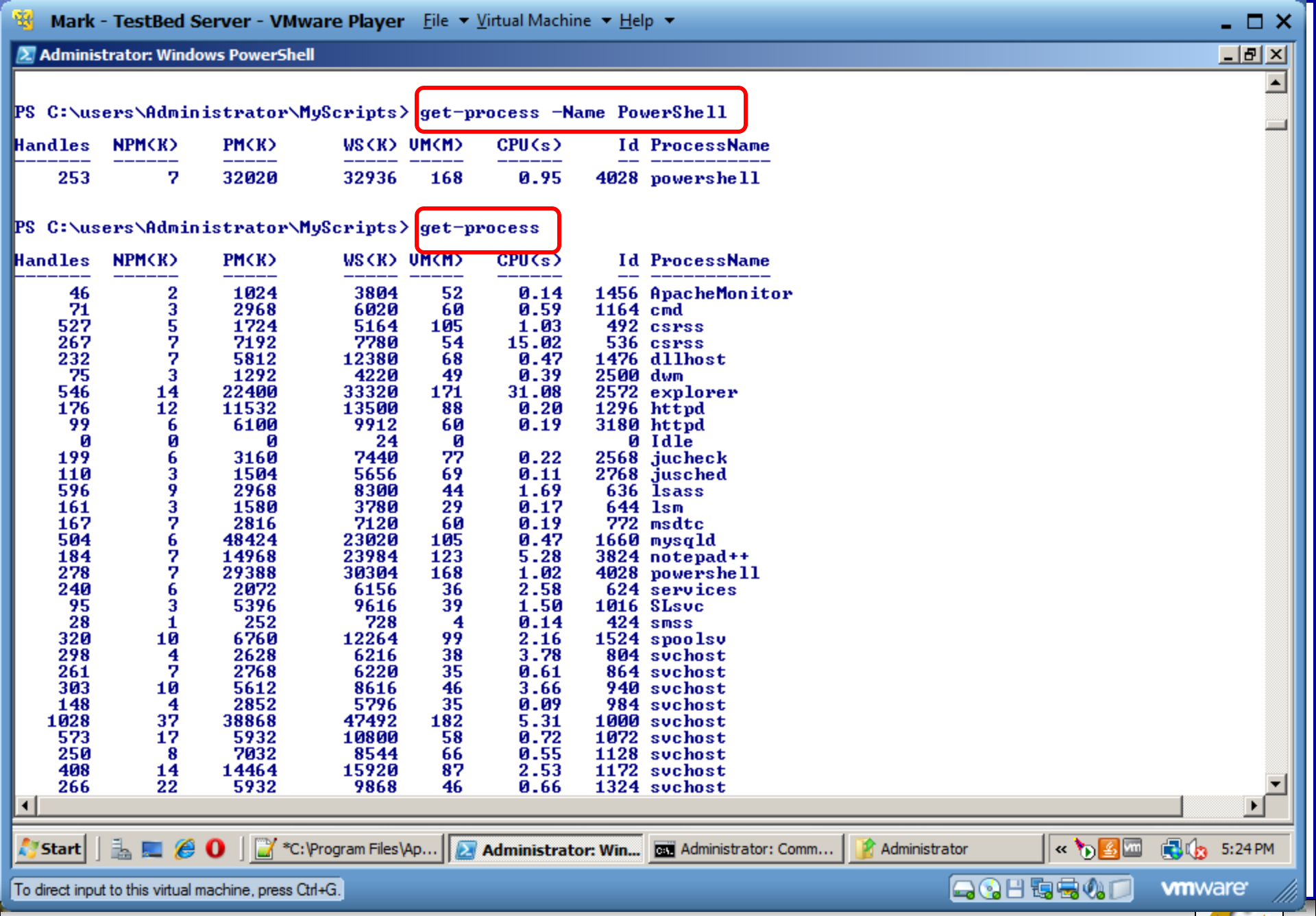
- The version of PowerShell that we are looking at is a standard CLI (Command Line Interface) shell.
- The syntax for using PowerShell from the CLI is similar to the syntax used for other CLI shells.
- The fundamental component of a PowerShell command, is of course, the name of the command to be executed.
- In addition, the command can be made more specific by using parameters and arguments to the parameters.
- Therefore, a PowerShell command can have any of the formats shown on the next page.

The PowerShell Environment

```
[command]

[command] -[parameter]

[command] -[parameter] -[parameter] [argument1]

[command] -[parameter] -[parameter] [argument1],[argument2]
```

- In PowerShell, a parameter is a variable that can be accepted by the command, script or function. An argument is a value assigned to a parameter.
- Although these terms are often used interchangeably, remembering the difference will be helpful when working with PowerShell.
- The following page illustrates all of these forms:


Administrator: Command Prompt
C:\Users\Administrator\MyScripts>dir
Volume in drive C has no label.
Volume Serial Number is 585F-AF04
Directory of C:\Users\Administrator\MyScripts
10/26/2011 11:23 AM <DIR> .
10/26/2011 11:23 AM <DIR> ..
10/26/2011 10:08 AM 138 ArrayScript.ps1
10/26/2011 11:23 AM 138 ArrayScript2.ps1
10/26/2011 11:42 AM 150 ArrayScript3.ps1
10/26/2011 11:23 AM 138 ArrayScript4.ps1
4 File(s) 564 bytes
2 Dir(s) 27,381,649,408 bytes free
C:\Users\Administrator\MyScripts>dir /w
Volume in drive C has no label.
Volume Serial Number is 585F-AF04
Directory of C:\Users\Administrator\MyScripts
[.] [..] ArrayScript.ps1 ArrayScript2.ps1
ArrayScript3.ps1 ArrayScript4.ps1
4 File(s) 564 bytes
2 Dir(s) 27,381,649,408 bytes free
C:\Users\Administrator\MyScripts>dir /w A*.ps1
Volume in drive C has no label.
Volume Serial Number is 585F-AF04
Directory of C:\Users\Administrator\MyScripts
ArrayScript.ps1 ArrayScript2.ps1 ArrayScript3.ps1 ArrayScript4.ps1
4 File(s) 564 bytes
0 Dir(s) 27,381,649,408 bytes free
C:\Users\Administrator\MyScripts>dir /w A*3.ps1, A*4.ps1
Volume in drive C has no label.
Volume Serial Number is 585F-AF04
Directory of C:\Users\Administrator\MyScripts
Directory of C:\Users\Administrator\MyScripts
ArrayScript3.ps1 ArrayScript4.ps1
2 File(s) 288 bytes
0 Dir(s) 27,381,649,408 bytes free
C:\Users\Administrator\MyScripts>

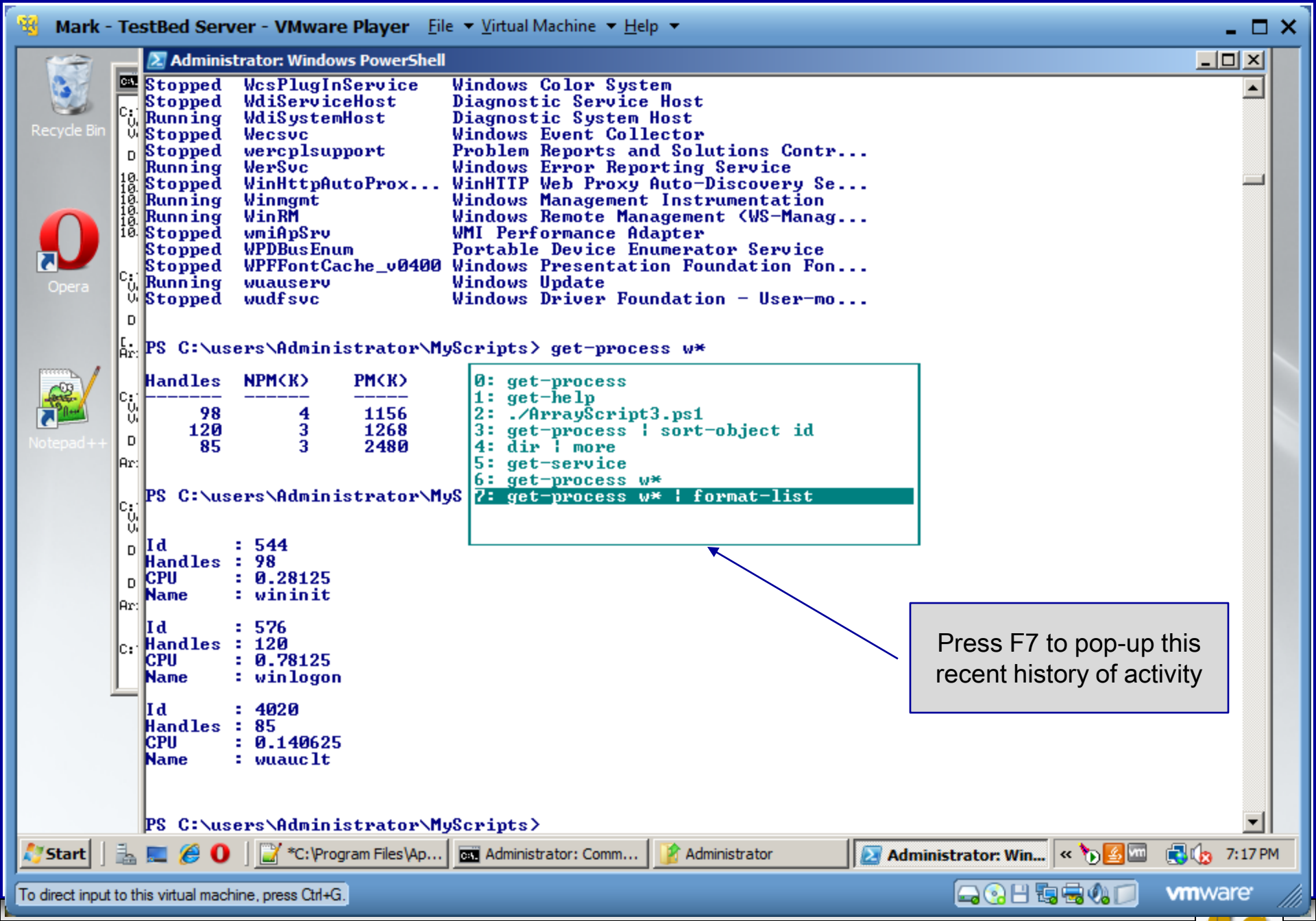

Mark - TestBed Server - VMware Player
File
Virtual Machine
Help
Administrator: Windows PowerShell
PS C:\users\Administrator\MyScripts> get-process -Name PowerShell
Handles NPM(K) PM(K) WS(K) VM(M) CPU(s) Id ProcessName
253 7 32020 32936 168 0.95 4028 powershell
PS C:\users\Administrator\MyScripts> get-process
Handles NPM(K) PM(K) WS(K) VM(M) CPU(s) Id ProcessName
46 2 1024 3804 52 0.14 1456 ApacheMonitor
71 3 2968 6020 60 0.59 1164 cmd
527 5 1724 5164 105 1.03 492 csrss
267 7 7192 7780 54 15.02 536 csrss
232 7 5812 12380 68 0.47 1476 dllhost
75 3 1292 4220 49 0.39 2500 dwm
546 14 22400 33320 171 31.08 2572 explorer
176 12 11532 13500 88 0.20 1296 httpd
99 6 6100 9912 60 0.19 3180 httpd
0 0 0 24 0 0 Idle
199 6 3160 7440 77 0.22 2568 jucheck
110 3 1504 5656 69 0.11 2768 jusched
596 9 2968 8300 44 1.69 636 lsass
161 3 1580 3780 29 0.17 644 lsm
167 7 2816 7120 60 0.19 772 msdtc
504 6 48424 23020 105 0.47 1660 mysqld
184 7 14968 23984 123 5.28 3824 notepad++
278 7 29388 30304 168 1.02 4028 powershell
240 6 2072 6156 36 2.58 624 services
95 3 5396 9616 39 1.50 1016 SLsvc
28 1 252 728 4 0.14 424 smss
320 10 6760 12264 99 2.16 1524 spoolsv
298 4 2628 6216 38 3.78 804 svchost
261 7 2768 6220 35 0.61 864 svchost
303 10 5612 8616 46 3.66 940 svchost
148 4 2852 5796 35 0.09 984 svchost
1028 37 38868 47492 182 5.31 1000 svchost
573 17 5932 10800 58 0.72 1072 svchost
250 8 7032 8544 66 0.55 1128 svchost
408 14 14464 15920 87 2.53 1172 svchost
266 22 5932 9868 46 0.66 1324 svchost
Start
*C:\Program Files\Ap...
Administrator: Win...
Administrator: Comm...
Administrator
5:24 PM
To direct input to this virtual machine, press Ctrl+G.
vmware

The PowerShell Environment

- As with all CLI-based shells, you need to understand how to navigate the PowerShell CLI to use it effectively.
- The table on the following page lists the editing operations associated with various keys when using the PowerShell Console.
- Most of the features of PowerShell are native to the `cmd` prompt, which makes PowerShell adoption easier for administrators already familiar with the Windows command line.
- The only major difference is the Tab key which is enhanced in PowerShell beyond the capabilities in the `cmd` prompt. In PowerShell the Tab key can be used to auto-complete commands, variables, parameter names, and even allowable operations on variables. Try some out!

PowerShell Console Editing Features

Keys	Editing Operation
Left and Right Arrows	Moves cursor left and right through the current command line.
Up and Down Arrows	Move up and down through the list of recently typed commands.
Insert	Switches between insert and overstrike text-entry modes.
Delete	Deletes the character at the current cursor position
Backspace	Deletes the character immediately preceding the current cursor position.
F7	Displays a list of recently typed commands in a pop-up window in the command shell. Use the up and down arrows to select a previously typed command, and then press Enter to execute the selected command. Use the ESC key to hide pop-up window.
Tab	Auto-completes command line sequences. Use the Shift+Tab sequence to move backward through a list of potential matches.


Mark - TestBed Server - VMware Player
File
Virtual Machine
Help
Administrator: Windows PowerShell
Stopped WcsPlugInService Windows Color System
Stopped WdiServiceHost Diagnostic Service Host
Running WdiSystemHost Diagnostic System Host
Stopped Wecsvc Windows Event Collector
Stopped wercplsupport Problem Reports and Solutions Contr...
Running WerSvc Windows Error Reporting Service
Stopped WinHttpAutoProx... WinHTTP Web Proxy Auto-Discovery Se...
Running Winmgmt Windows Management Instrumentation
Running WinRM Windows Remote Management (WS-Manag...
Stopped wmiApSrv WMI Performance Adapter
Stopped WPDBusEnum Portable Device Enumerator Service
Stopped WPFFontCache_v0400 Windows Presentation Foundation Fon...
Running wuauserv Windows Update
Stopped wudfsvc Windows Driver Foundation - User-mo...
PS C:\users\Administrator\MyScripts> get-process w*
Handles NPM(K) PM(K)
98 4 1156
120 3 1268
85 3 2480
PS C:\users\Administrator\MyS
0: get-process
1: get-help
2: ./ArrayScript3.ps1
3: get-process | sort-object id
4: dir | more
5: get-service
6: get-process w*
7: get-process w* | format-list
Id : 544
Handles : 98
CPU : 0.28125
Name : wininit
Id : 576
Handles : 120
CPU : 0.78125
Name : winlogon
Id : 4020
Handles : 85
CPU : 0.140625
Name : wuauclt
PS C:\users\Administrator\MyScripts>
Press F7 to pop-up this recent history of activity
Start
*C:\Program Files\Ap...
Administrator: Comm...
Administrator
Administrator: Win...
7:17 PM
To direct input to this virtual machine, press Ctrl+G.
vmware

Understanding Cmdlets In PowerShell

- Cmdlets are a fundamental part of Powershell's functionality. They are implemented as managed classes (built on the .NET Framework) that include a well-defined set of methods to process data.
- A cmdlet developer writes the code that runs when the cmdlet is classed and compiles the code into a DLL that's loaded into a PowerShell instance when the shell is started.
- You already saw in a previous set of notes that cmdlets are always named with the format Verb-Noun where the verb specifies the action an the noun specifies the object to operate on.

Understanding Cmdlets In PowerShell

- Because cmdlets derive from a base class, a number of common parameters, which are available to all cmdlets, can be used to help provide a more consistent interface for PowerShell cmdlets.
- These common parameters are shown in the tables on the next two pages.

Common Cmdlet Parameters In PowerShell

Parameter	Data Type	Description
Verbose	Boolean	Generates detailed information about the operation, much like tracing or a transaction log. This parameter is effective only in cmdlets that generate verbose data.
Debug	Boolean	Generates programmer-level detail about the operation. The cmdlet must support the generation of debug data for this parameter to be effective.
ErrorAction	Enum	Determines how the cmdlet responds when an error occurs. Values are Continue (default), Stop, SilentlyContinue, and Inquire.
ErrorVariable	String	Specifies a variable that stores errors from the cmdlet during processing. This variable is populated in addition to $error.
OutVariable	String	Specifies a variable that stores output from the cmdlet during processing.

Common Cmdlet Parameters In PowerShell

Parameter	Data Type	Description
OutBuffer	Int32	Determines the number of objects to buffer before calling the next cmdlet in the pipeline.
WhatIf	Boolean	Explains what happens if the cmdlet is executed but doesn't actually execute the command.
Confirm	Boolean	Prompts the user for permission before performing any action that modifies the system.

NOTE: The last two parameters in the table, WhatIf and Confirm, are special in that they require a cmdlet to support the .NET method ShouldProcess, which might not be true for all cmdlets. The ShouldProcess method confirms the operation with the user, sending the name of the resource to be changed for confirmation before performing the operation.

Understanding Cmdlets In PowerShell

- When you're first starting to work in PowerShell, the get-help and get-command cmdlets can be quite useful.
- You already saw a few instances of the `get-help` cmdlet in the first set of PowerShell notes.
- PowerShell has two parameters for the get-help cmdlet:

  -detailed, and –full.

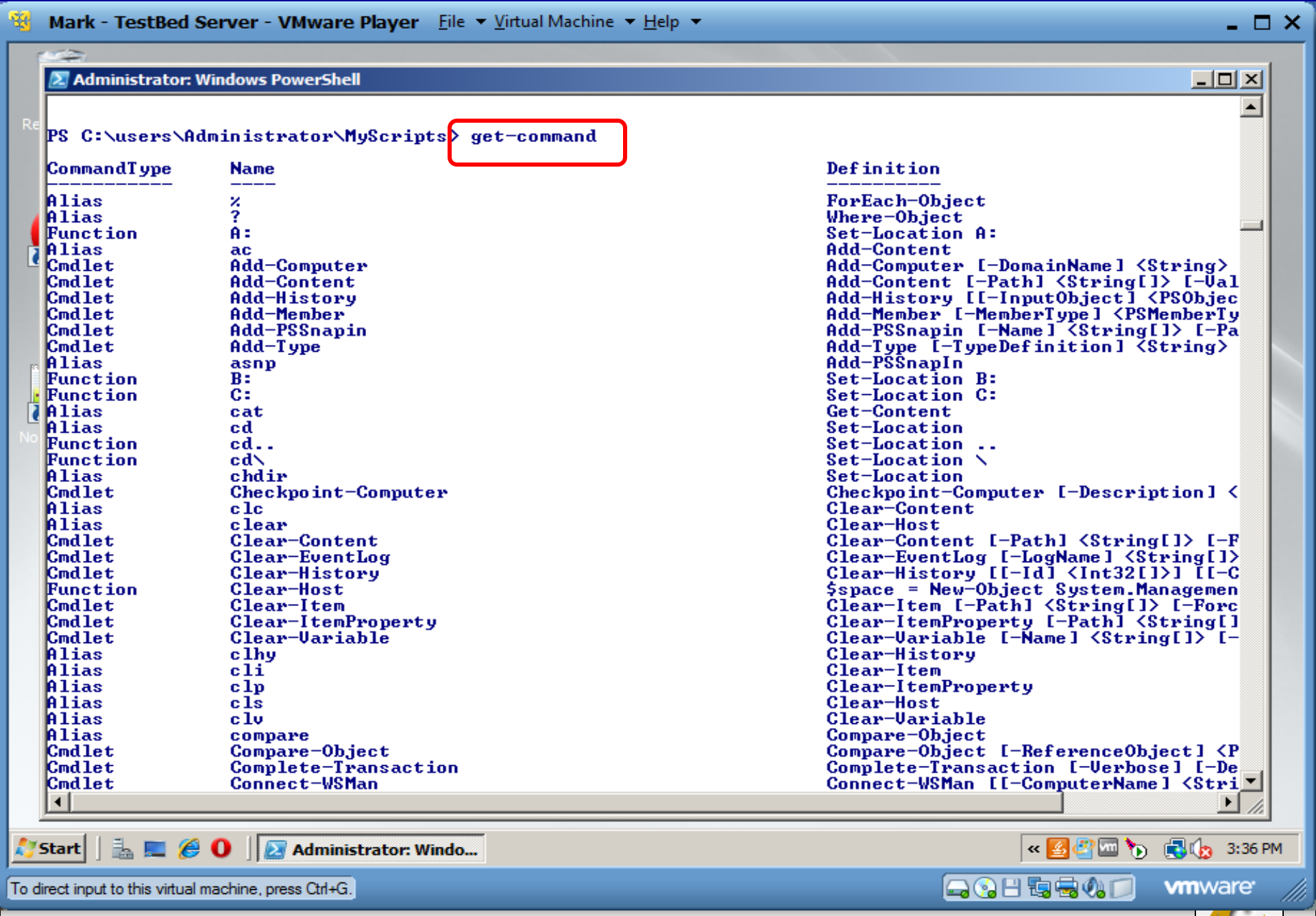
- The –detailed parameter displays additional information about a cmdlet, including descriptions of parameters and examples of using the cmdlet. The –full parameter displays the entire help file for a cmdlet, including technical information about parameters.
- The table on the next page illustrates the sections returned by help.

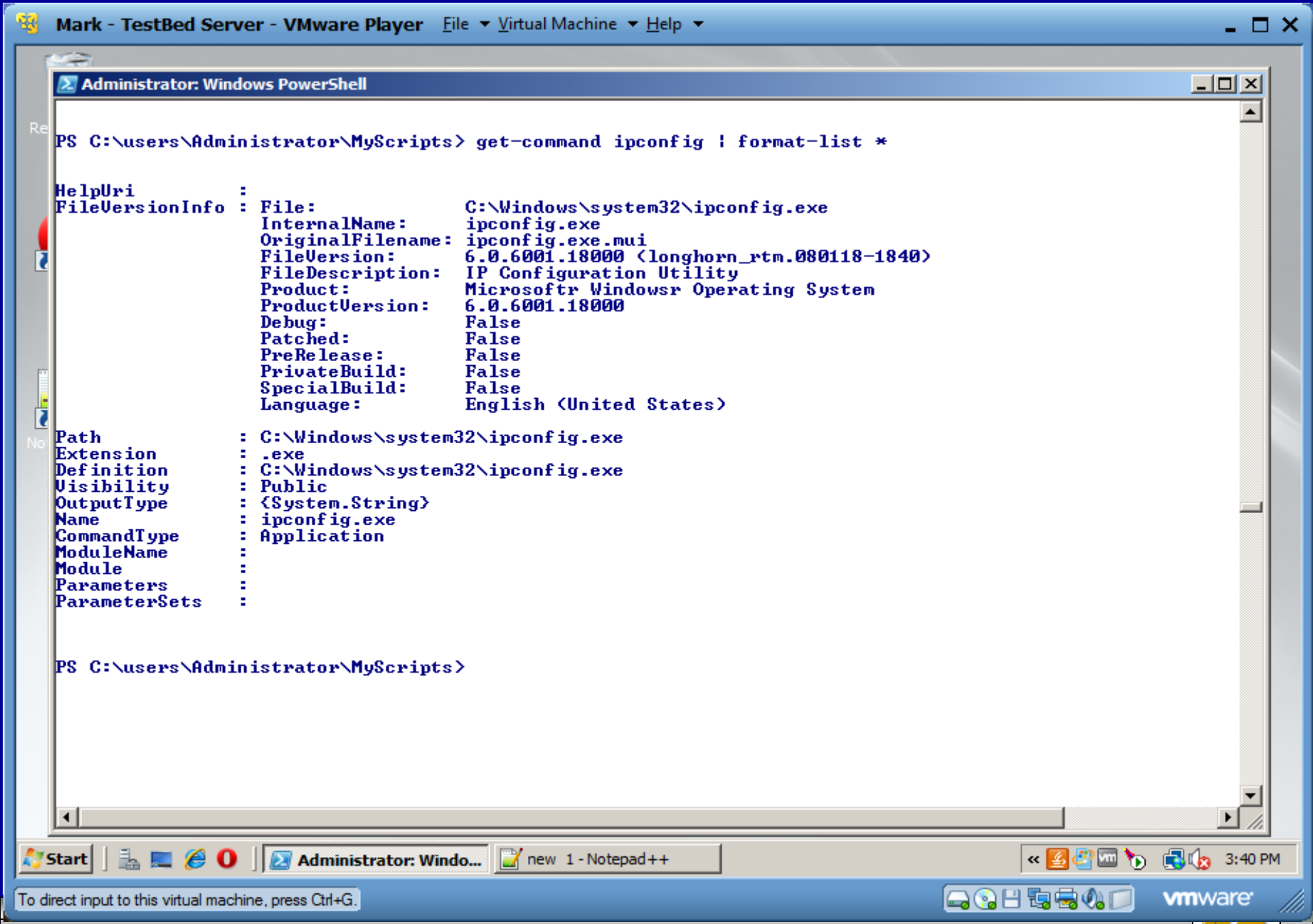
Components of `get-help`

Help Section	Description
Name	The name of the cmdlet
Synopsis	A brief description of what the cmdlet does.
Detailed Description	A detailed description of the cmdlet's behavior, usually including usage examples.
Syntax	Specific usage details for entering commands with the cmdlet.
Parameters	Valid parameters that can be used with this cmdlet.
Input Type	The type of input this cmdlet accepts
Output Type	The type of data this cmdlet returns
Terminating Errors	If present, identifies any errors that result in the cmdlet terminating prematurely.
Non-Terminating Errors	Identifies noncritical errors that might occur while the cmdlet is running but don't cause the cmdlet to terminate.
Notes	Additional details on the cmdlet
Examples	Common usages examples for the cmdlet
Related Links	References to other cmdlets that perform similar tasks.

Understanding Cmdlets In PowerShell

- The get-command cmdlet is also quite useful as it lists all the available cmdlets in a PowerShell session.
- It is more powerful than `get-help` because it lists all available commands, including cmdlets, scripts, aliases, functions, and native applications in a PowerShell session.
- The next couple of pages illustrate some variations of the get-command cmdlet.


Mark - TestBed Server - VMware Player
File
Virtual Machine
Help
Administrator: Windows PowerShell
PS C:\users\Administrator\MyScripts> get-command
CommandType Name Definition
Alias % ForEach-Object
Alias ? Where-Object
Function A: Set-Location A:
Alias ac Add-Content
Cmdlet Add-Computer Add-Computer [-DomainName] <String>
Cmdlet Add-Content Add-Content [-Path] <String[]> [-Val
Cmdlet Add-History Add-History [[-InputObject] <PSObjec
Cmdlet Add-Member Add-Member [-MemberType] <PSMemberTy
Cmdlet Add-PSSnapin Add-PSSnapin [-Name] <String[]> [-Pa
Cmdlet Add-Type Add-Type [-TypeDefinition] <String>
Alias asnp Add-PSSnapIn
Function B: Set-Location B:
Function C: Set-Location C:
Alias cat Get-Content
Alias cd Set-Location
Function cd.. Set-Location ..
Function cd\ Set-Location \
Alias chdir Set-Location
Cmdlet Checkpoint-Computer Checkpoint-Computer [-Description] <
Alias clc Clear-Content
Alias clear Clear-Host
Cmdlet Clear-Content Clear-Content [-Path] <String[]> [-P
Cmdlet Clear-EventLog Clear-EventLog [-LogName] <String[]>
Cmdlet Clear-History Clear-History [[-Id] <Int32[]>] [[-C
Function Clear-Host $space = New-Object System.Managemen
Cmdlet Clear-Item Clear-Item [-Path] <String[]> [-Forc
Cmdlet Clear-ItemProperty Clear-ItemProperty [-Path] <String[]
Cmdlet Clear-Variable Clear-Variable [-Name] <String[]> [-
Alias clhy Clear-History
Alias cli Clear-Item
Alias clp Clear-ItemProperty
Alias cls Clear-Host
Alias clv Clear-Variable
Alias compare Compare-Object
Cmdlet Compare-Object Compare-Object [-ReferenceObject] <P
Cmdlet Complete-Transaction Complete-Transaction [-Verbose] [-De
Cmdlet Connect-WSMan Connect-WSMan [[-ComputerName] <Stri
Start
Administrator: Windo...
3:36 PM
To direct input to this virtual machine, press Ctrl+G.
vmware


Mark - TestBed Server - VMware Player
File
Virtual Machine
Help
Administrator: Windows PowerShell
PS C:\users\Administrator\MyScripts> get-command ipconfig | format-list *
HelpUri :
FileVersionInfo : File: C:\Windows\system32\ipconfig.exe
InternalName: ipconfig.exe
OriginalFilename: ipconfig.exe.mui
FileVersion: 6.0.6001.18000 (longhorn_rtm.080118-1840)
FileDescription: IP Configuration Utility
Product: Microsoftr Windowsr Operating System
ProductVersion: 6.0.6001.18000
Debug: False
Patched: False
PreRelease: False
PrivateBuild: False
SpecialBuild: False
Language: English (United States)
Path : C:\Windows\system32\ipconfig.exe
Extension : .exe
Definition : C:\Windows\system32\ipconfig.exe
Visibility : Public
OutputType : {System.String}
Name : ipconfig.exe
CommandType : Application
ModuleName :
Module :
Parameters :
ParameterSets :
PS C:\users\Administrator\MyScripts>
Start
Administrator: Windo...
new 1 - Notepad++
3:40 PM
To direct input to this virtual machine, press Ctrl+G.
vmware

Variables In PowerShell

- In most shells, the only data that can be stored in a variable is text data. In advanced shells and programming languages, data stored in a variable can be almost anything, from strings, to sequences of objects.
- Similarly, PowerShell variables can hold just about anything.
- To define a PowerShell variable, you must name it with the `$` prefix, which helps delineate variables from aliases, cmdlets, filenames, and other items a shell operator might need to use.
- A variable name is case sensitive and can contain any combination of alphanumeric characters (A-Z,a-z,0-9) and the underscore (_) character.

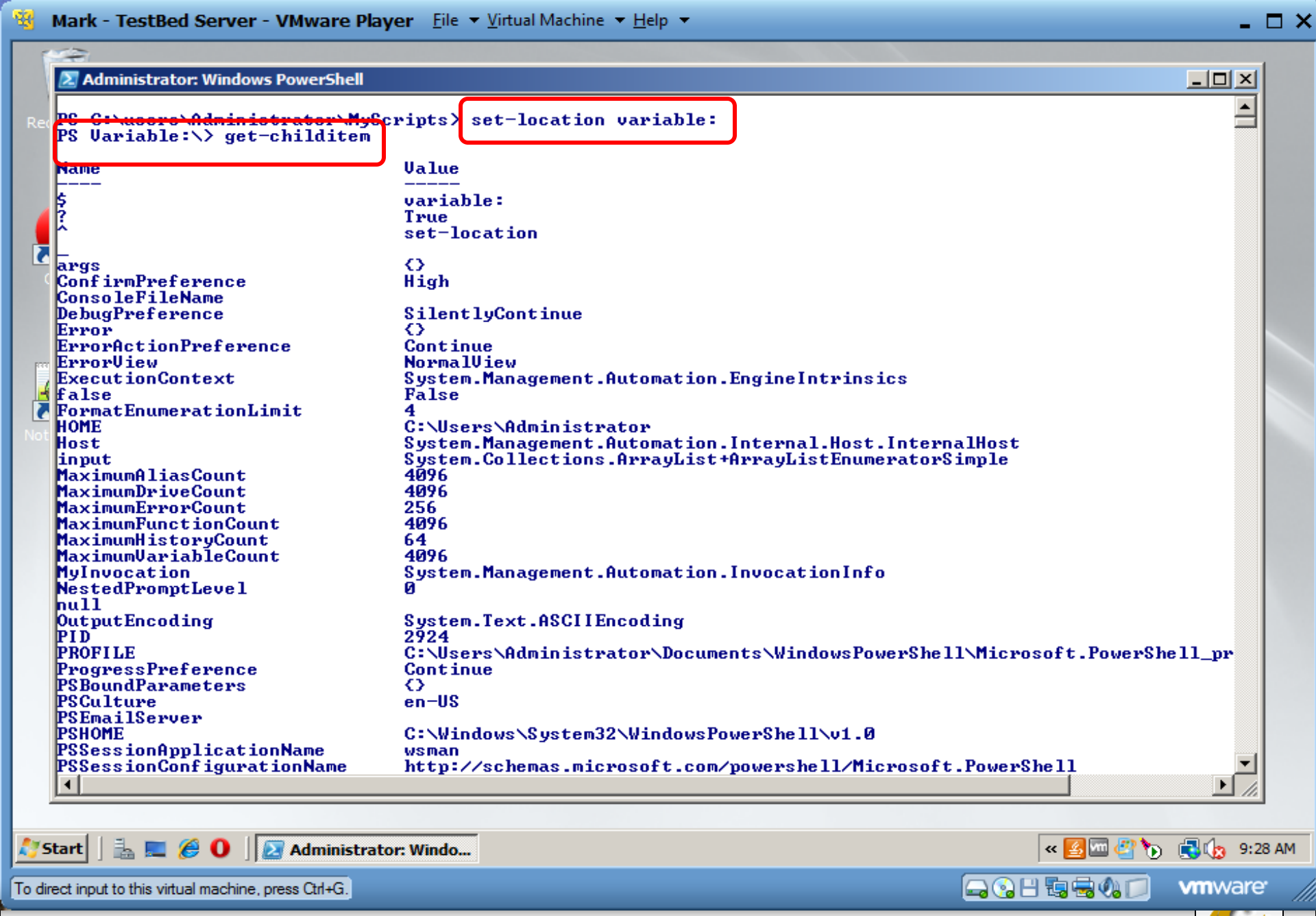
$MSProcesses = get-process | where {$_.company –match ".*Microsoft*"}

```
PS C:\users\Administrator\MyScripts> $MSProcesses = get-process | where {$_.company -match ".*Microsoft*
PS C:\users\Administrator\MyScripts> $MSProcesses

Handles  NPM(K)    PM(K)      WS(K) VM(M)   CPU(s)     Id ProcessName
-------  ------    -----      ----- -----   ------     -- -----------
    519       5     1672       5076   105     0.86    496 csrss
    256       8     6912       7224   111     7.14    540 csrss
    233       7     5836      12404    68     0.38   2512 dllhost
     75       3     1320       4212    49     0.45   1880 dwm
    450      12    16936      26508   157     8.05   2116 explorer
    572       9     2976       8268    44     1.39    640 lsass
    159       3     1560       3764    29     0.06    648 lsm
    167       7     2808       7112    60     0.20   2680 msdtc
    406       8    34128      35756   179     2.53   2480 powershell
    240       6     2100       6136    36     2.47    628 services
     95       3     5368       9604    39     1.19   1020 SLsvc
     28       1      252        728     4     0.23    428 smss
    307      10     6924      12452   100     1.97   1524 spoolsv
    297       4     2672       6260    38     4.11    808 svchost
    253       7     2732       6160    35     0.34    868 svchost
    287       9     5228       8092    46     1.53    944 svchost
    124       3     1628       4664    32     0.06    988 svchost
   1019      35    39880      49036   184     6.28   1004 svchost
    577      16     5920      10760    59     0.73   1080 svchost
    249       8     6996       8496    66     0.55   1132 svchost
    406      13    14168      15396    87     1.30   1184 svchost
    269      22     5964       9928    47     0.50   1328 svchost
    125       5     1856       5268    36     0.11   1772 svchost
     73       2      832       2880    23     0.02   1784 svchost
     44       1      540       2284    15     0.00   1932 svchost
    226       7     3168       4928    50     0.08   3088 svchost
    137       5     1868       5904    53     0.06   1432 taskeng
    247       7     2812       7584    73     0.28   2072 taskeng
     98       4     1160       3932    41     0.20    548 wininit
    118       3     1232       4368    32     0.41    580 winlogon
     83       3     2468       5260    69     0.08   3700 wuauclt

PS C:\users\Administrator\MyScripts> _
```

The variable $MSProcesses holds a collection of Microsoft processes that are currently running on the system.

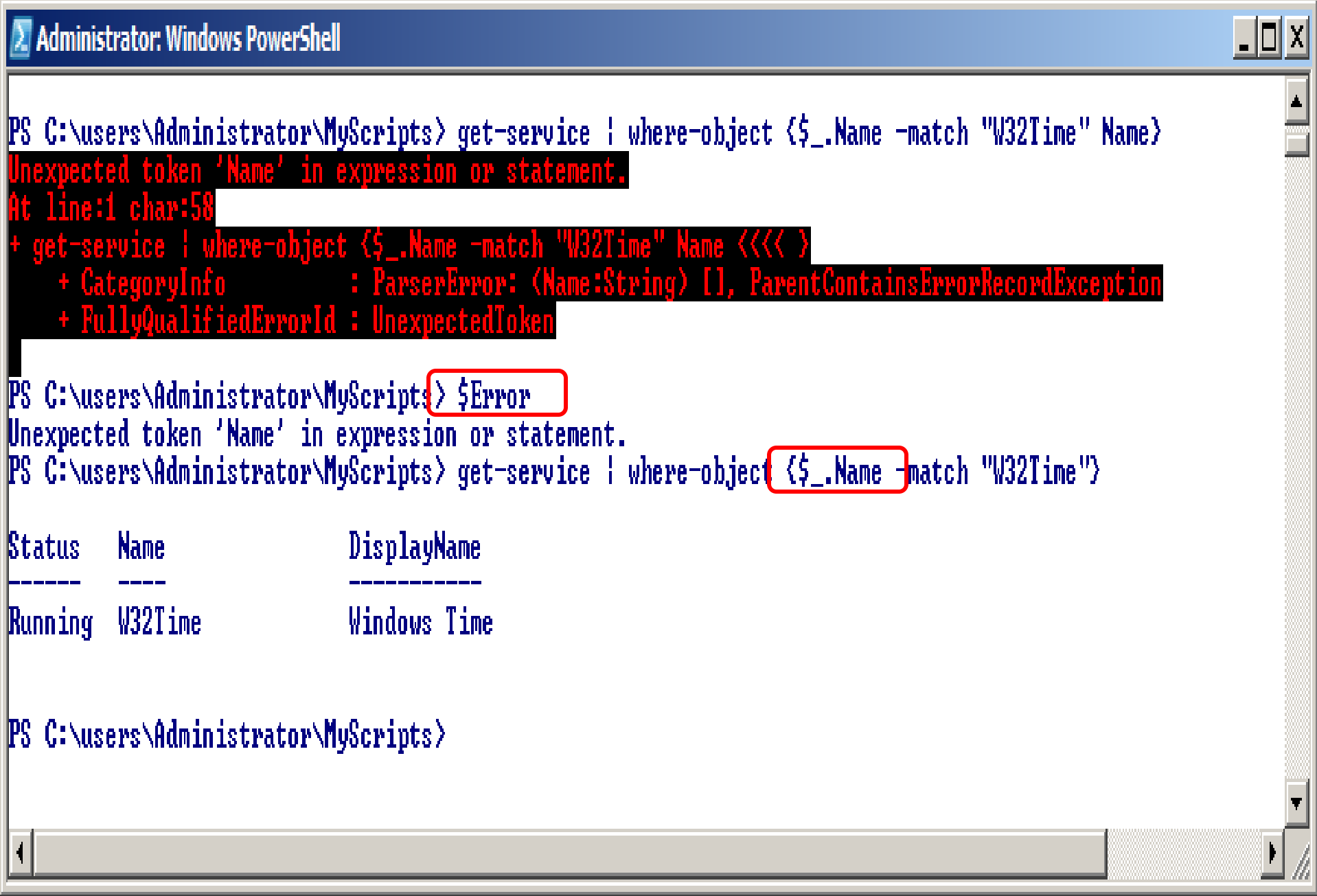
Variables In PowerShell

- When a PowerShell session is started, a number of built-in variables are defined automatically.
- These variables are often helpful with various system administration duties. Becoming familiar with them as well as their default values is recommended.
- The next page illustrates a partial listing of these built-in PowerShell variables.


Mark - TestBed Server - VMware Player
File
Virtual Machine
Help
Administrator: Windows PowerShell
PS C:\Users\Administrator\MyScripts> set-location variable:
PS Variable:\> get-childitem
Name Value
$ variable:
? True
^ set-location
_
args {}
ConfirmPreference High
ConsoleFileName
DebugPreference SilentlyContinue
Error {}
ErrorActionPreference Continue
ErrorView NormalView
ExecutionContext System.Management.Automation.EngineIntrinsics
false False
FormatEnumerationLimit 4
HOME C:\Users\Administrator
Host System.Management.Automation.Internal.Host.InternalHost
input System.Collections.ArrayList+ArrayListEnumeratorSimple
MaximumAliasCount 4096
MaximumDriveCount 4096
MaximumErrorCount 256
MaximumFunctionCount 4096
MaximumHistoryCount 64
MaximumVariableCount 4096
MyInvocation System.Management.Automation.InvocationInfo
NestedPromptLevel 0
null
OutputEncoding System.Text.ASCIIEncoding
PID 2924
PROFILE C:\Users\Administrator\Documents\WindowsPowerShell\Microsoft.PowerShell_pr
ProgressPreference Continue
PSBoundParameters {}
PSCulture en-US
PSEmailServer
PSHOME C:\Windows\System32\WindowsPowerShell\v1.0
PSSessionApplicationName wsman
PSSessionConfigurationName http://schemas.microsoft.com/powershell/Microsoft.PowerShell
Start
Administrator: Windo...
9:28 AM
To direct input to this virtual machine, press Ctrl+G.
vmware

Variables In PowerShell

- These built-in PowerShell variables are divided into two types.
- The first type has a special meaning in PowerShell because they store configuration information for the current PowerShell session.
- Of these special variables, two are commonly used:
  - $_ - contains the current pipeline object
  - $Error - contains error objects for the current PowerShell session
- The next page illustrates an example of both:


Administrator: Windows PowerShell
PS C:\users\Administrator\MyScripts> get-service | where-object {$_.Name -match "W32Time" Name}
Unexpected token 'Name' in expression or statement.
At line:1 char:58
+ get-service | where-object {$_.Name -match "W32Time" Name <<<< }
+ CategoryInfo : ParserError: (Name:String) [], ParentContainsErrorRecordException
+ FullyQualifiedErrorId : UnexpectedToken
PS C:\users\Administrator\MyScripts> $Error
Unexpected token 'Name' in expression or statement.
PS C:\users\Administrator\MyScripts> get-service | where-object {$_.Name -match "W32Time"}
Status Name DisplayName
Running W32Time Windows Time
PS C:\users\Administrator\MyScripts>

Variables In PowerShell

- The second type of built-in variable consists of preference settings used to control the behavior of PowerShell.
- The table on the next page describes these variables.
  - NOTE: A Command Policy can be one of the following strings:
    - `SilentlyContinue`
    - `NotifyContinue`
    - `NotifyStop`
    - `Inquire`

PowerShell Preference Setting Built-in Variables

Name	Allowed Values	Description
`$DebugPreference`	Command Policy	Action to take when data is written via `Write-Debug` in a script or `WriteDebug()` in a cmdlet.
`$ErrorActionPreference`	Command Policy	Action to take when data is written via `Write-Error` in a script or `WriteError()` in a cmdlet.
`$MaximumAliasCount`	Integer	Maximum number of allowed aliases
`$MaximumDriveCount`	Integer	Maximum number of allowed drives
`$MaximumErrorCount`	Integer	Maximum number of errors held by `$Error`
`$MaximumFunctionCount`	Integer	Maximum number of functions that can be created
`$MaximumVariableCount`	Integer	Maximum number of variables that can be created
`$MaximumHistoryCount`	Integer	Maximum number of entries saved in the command history
`$ShouldProcessPreference`	Command Policy	Action to take when `ShouldProcess` is used in a cmdlet
`$ProcessReturnPreference`	Boolean	`ShouldProcess` returns this setting
`$ProgressPreference`	Command Policy	Action to take when data is written via `Write-Progress` in a script or `WriteProgress()` in a cmdlet.
`$VerbosePreference`	Command Policy	Action to take when data is written via `Write-Verbose` in a script or `Write-Verbose()` in a cmdlet.

Understanding Aliases In PowerShell

- Unless you are using a script, PowerShell can require a fair amount of typing to run various command sequences.
- As with many scripting languages, PowerShell has an aliasing mechanism for cmdlets and executables, which can cut down on the amount of typing needed.
- Consider the two versions of the command shown on the next pages.
- NOTE: this example doesn't provide a major reduction in typing per se, but aliases can save you some time and prevent typos. To see the list of PowerShell aliases supported in the current session use the `get-alias` cmdlet as shown on page 29.

get-process | where-object {$_.company –match ".*Microsoft*"} | format-table Name, Id, Path -Autosize

Administrator: Windows PowerShell

```
Windows PowerShell
Copyright (C) 2009 Microsoft Corporation. All rights reserved.

PS C:\users\Administrator\MyScripts> get-process | where-object {$_.company -match ".*Microsoft*"} | format-t
Id, Path, Company -Autosize

Name                Id Path                                                                Company
----                -- ----                                                                -------
csrss              492 C:\Windows\system32\csrss.exe                                       Microsoft Corporation
csrss              536 C:\Windows\system32\csrss.exe                                       Microsoft Corporation
dllhost           3748 C:\Windows\system32\dllhost.exe                                     Microsoft Corporation
dwm               2228 C:\Windows\system32\Dwm.exe                                         Microsoft Corporation
explorer          2284 C:\Windows\Explorer.EXE                                             Microsoft Corporation
lsass              636 C:\Windows\system32\lsass.exe                                       Microsoft Corporation
lsm                644 C:\Windows\system32\lsm.exe                                         Microsoft Corporation
msdtc             3968 C:\Windows\System32\msdtc.exe                                       Microsoft Corporation
powershell        1256 C:\WINDOWS\system32\WindowsPowerShell\v1.0\powershell.exe           Microsoft Corporation
services           624 C:\Windows\system32\services.exe                                    Microsoft Corporation
SLsvc             1028 C:\Windows\system32\SLsvc.exe                                       Microsoft Corporation
smss               424 C:\Windows\system32\smss.exe                                        Microsoft Corporation
spoolsv           1536 C:\Windows\System32\spoolsv.exe                                     Microsoft Corporation
svchost            812 C:\Windows\system32\svchost.exe                                     Microsoft Corporation
svchost            860 C:\Windows\system32\svchost.exe                                     Microsoft Corporation
svchost            876 C:\Windows\system32\svchost.exe                                     Microsoft Corporation
svchost            968 C:\Windows\System32\svchost.exe                                     Microsoft Corporation
svchost            984 C:\Windows\system32\svchost.exe                                     Microsoft Corporation
svchost            996 C:\Windows\system32\svchost.exe                                     Microsoft Corporation
svchost           1016 C:\Windows\system32\svchost.exe                                     Microsoft Corporation
svchost           1084 C:\Windows\system32\svchost.exe                                     Microsoft Corporation
svchost           1140 C:\Windows\System32\svchost.exe                                     Microsoft Corporation
svchost           1168 C:\Windows\system32\svchost.exe                                     Microsoft Corporation
svchost           1328 C:\Windows\system32\svchost.exe                                     Microsoft Corporation
svchost           1780 C:\Windows\System32\svchost.exe                                     Microsoft Corporation
svchost           2324 C:\Windows\system32\svchost.exe                                     Microsoft Corporation
taskeng           1444 C:\Windows\system32\taskeng.exe                                     Microsoft Corporation
taskeng           2152 C:\Windows\system32\taskeng.exe                                     Microsoft Corporation
TrustedInstaller  3616 C:\Windows\servicing\TrustedInstaller.exe                           Microsoft Corporation
wininit            564 C:\Windows\system32\wininit.exe                                     Microsoft Corporation
winlogon           572 C:\Windows\system32\winlogon.exe                                    Microsoft Corporation
WmiPrvSE          1276 C:\Windows\system32\wbem\wmiprvse.exe                               Microsoft Corporation


PS C:\users\Administrator\MyScripts>
```


gps | ? {$_.company –match ".*Microsoft*"} | ft Name, Id, Path -Autosize

Administrator: Windows PowerShell

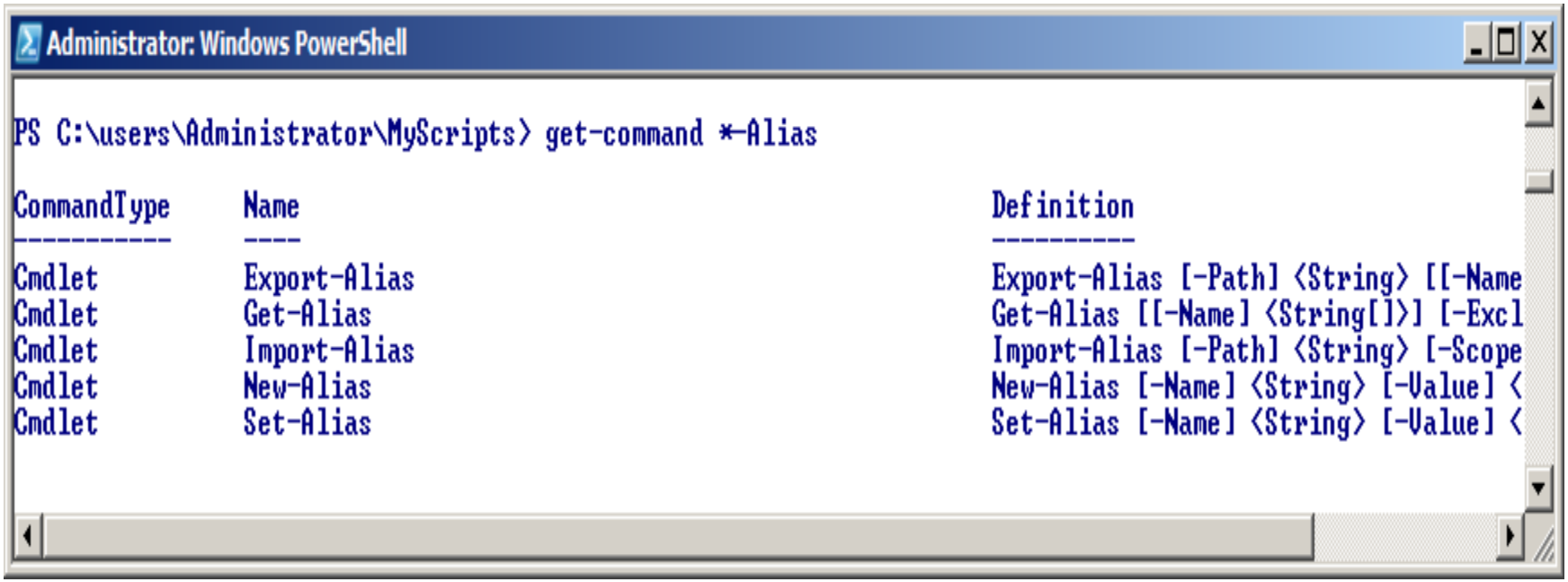
```
PS C:\users\Administrator\MyScripts>
PS C:\users\Administrator\MyScripts> gps | ? {$_.company -match ".*Microsoft*"} | ft Name, Id, Path, Company

Name                Id Path                                                    Company
----                -- ----                                                    -------
csrss              492 C:\Windows\system32\csrss.exe                           Microsoft Corporation
csrss              536 C:\Windows\system32\csrss.exe                           Microsoft Corporation
dllhost           3748 C:\Windows\system32\dllhost.exe                         Microsoft Corporation
dwm               2228 C:\Windows\system32\Dwm.exe                             Microsoft Corporation
explorer          2284 C:\Windows\Explorer.EXE                                 Microsoft Corporation
lsass              636 C:\Windows\system32\lsass.exe                           Microsoft Corporation
lsm                644 C:\Windows\system32\lsm.exe                             Microsoft Corporation
msdtc             3968 C:\Windows\System32\msdtc.exe                           Microsoft Corporation
powershell        1256 C:\WINDOWS\system32\WindowsPowerShell\v1.0\powershell.exe Microsoft Corporation
services           624 C:\Windows\system32\services.exe                        Microsoft Corporation
SLsvc             1028 C:\Windows\system32\SLsvc.exe                           Microsoft Corporation
smss               424 C:\Windows\system32\smss.exe                            Microsoft Corporation
spoolsv           1536 C:\Windows\System32\spoolsv.exe                         Microsoft Corporation
svchost            812 C:\Windows\system32\svchost.exe                         Microsoft Corporation
svchost            860 C:\Windows\system32\svchost.exe                         Microsoft Corporation
svchost            876 C:\Windows\system32\svchost.exe                         Microsoft Corporation
svchost            968 C:\Windows\System32\svchost.exe                         Microsoft Corporation
svchost            984 C:\Windows\system32\svchost.exe                         Microsoft Corporation
svchost            996 C:\Windows\system32\svchost.exe                         Microsoft Corporation
svchost           1016 C:\Windows\system32\svchost.exe                         Microsoft Corporation
svchost           1084 C:\Windows\system32\svchost.exe                         Microsoft Corporation
svchost           1140 C:\Windows\System32\svchost.exe                         Microsoft Corporation
svchost           1168 C:\Windows\system32\svchost.exe                         Microsoft Corporation
svchost           1328 C:\Windows\system32\svchost.exe                         Microsoft Corporation
svchost           1780 C:\Windows\System32\svchost.exe                         Microsoft Corporation
svchost           2324 C:\Windows\system32\svchost.exe                         Microsoft Corporation
taskeng            540 C:\Windows\system32\taskeng.exe                         Microsoft Corporation
taskeng           1444 C:\Windows\system32\taskeng.exe                         Microsoft Corporation
taskeng           2152 C:\Windows\system32\taskeng.exe                         Microsoft Corporation
TrustedInstaller  3616 C:\Windows\servicing\TrustedInstaller.exe               Microsoft Corporation
wininit            564 C:\Windows\system32\wininit.exe                         Microsoft Corporation
winlogon           572 C:\Windows\system32\winlogon.exe                        Microsoft Corporation


PS C:\users\Administrator\MyScripts>
```


Administrator: Windows PowerShell

```
PS C:\users\Administrator\MyScripts> get-alias

CommandType     Name                                               Definition
-----------     ----                                               ----------
Alias           %                                                  ForEach-Object
Alias           ?                                                  Where-Object
Alias           ac                                                 Add-Content
Alias           asnp                                               Add-PSSnapIn
Alias           cat                                                Get-Content
Alias           cd                                                 Set-Location
Alias           chdir                                              Set-Location
Alias           clc                                                Clear-Content
Alias           clear                                              Clear-Host
Alias           clhy                                               Clear-History
Alias           cli                                                Clear-Item
Alias           clp                                                Clear-ItemProperty
Alias           cls                                                Clear-Host
Alias           clv                                                Clear-Variable
Alias           compare                                            Compare-Object
Alias           copy                                               Copy-Item
Alias           cp                                                 Copy-Item
Alias           cpi                                                Copy-Item
Alias           cpp                                                Copy-ItemProperty
Alias           cvpa                                               Convert-Path
Alias           dbp                                                Disable-PSBreakpoint
Alias           del                                                Remove-Item
Alias           diff                                               Compare-Object
Alias           dir                                                Get-ChildItem
Alias           ebp                                                Enable-PSBreakpoint
Alias           echo                                               Write-Output
Alias           epal                                               Export-Alias
Alias           epcsv                                              Export-Csv
Alias           epsn                                               Export-PSSession
Alias           erase                                              Remove-Item
Alias           etsn                                               Enter-PSSession
Alias           exsn                                               Exit-PSSession
Alias           fc                                                 Format-Custom
Alias           fl                                                 Format-List
Alias           foreach                                            ForEach-Object
Alias           ft                                                 Format-Table
Alias           fw                                                 Format-Wide
```


Understanding Aliases In PowerShell

- There are several cmdlets that deal with aliases in PowerShell. The previous page illustrates the `get-alias` cmdlet.
- There are a few more that allow you to define your own aliases and to import and export aliases to other PowerShell sessions.



Understanding Aliases In PowerShell

- The `Export-Alias` and `Import-Alias` cmdlets are used to export and import aliases from one PowerShell session to another.
- The `New-Alias` and `Set-Alias` cmdlets allow you to define new aliases for the current PowerShell session.
- Note that by default, all aliasing pertains only to a PowerShell session. Exiting PowerShell discards any existing aliases.
- For an alias to be persistent, it must be defined using the `set-alias` cmdlet and defined in the `profile.ps1` file. You can find the location of this file on your machine by typing `$profile` at the PowerShell prompt.

CAUTION: Using Aliases In PowerShell

- Although command shortening may seem appealing, extensive use of aliasing is not recommended.
- One reason is that aliases are not very portable to scripts. For example, if you are using a lot of aliases in a script, you must include a `set-alias` sequence at the start of the script to ensure that those aliases are present, regardless of the machine, or session profile, when the script runs.
- However, a bigger concern is the probability that an alias can obscure or confuse the true meaning of commands or scripts. The aliases you define might make sense to you, but not everyone may share your logic in defining aliases. In general, functions are a better way to go than extensive aliasing.