

# CNT 4603: System Administration Fall 2012

## Scripting – Windows PowerShell – Part 1

Instructor :      Dr. Mark Llewellyn  
                         markl@cs.ucf.edu  
                         HEC 236, 4078-823-2790  
                         <http://www.cs.ucf.edu/courses/cnt4603/fall2012>

Department of Electrical Engineering and Computer Science  
Computer Science Division  
University of Central Florida



# Scripting – Windows PowerShell

- A **shell** is software that provides a customized interface designed for executing commands or scripts. (The term originated from OS nomenclature where the outer layer of a layered architecture OS was the interface between the user and the kernel of the OS.)
- Most OS shells generally fall into one of two categories: command-line and graphical . Command-line shells provide a command-line interface (CLI) to the OS, while graphical shells provide a graphical user interface (GUI).
- In either category the primary purpose of the shell is to invoke or “launch” other programs. In most modern environments, shells frequently have additional capabilities such as viewing the contents of directories.



# Scripting – Windows PowerShell

- Windows PowerShell is a command-line interface (CLI).
- Two important features of PowerShell are scripts and cmdlets.
- A **script** is a file of commands that is run when you execute or invoke the script.
- A **cmdlet** (short for command-let, its pronounced like the long version) is a specialized (lightweight – they are technically instances of .NET Framework classes and are not stand-alone executables) command for completing common tasks in the PowerShell environment.
- There are about 130 built-in cmdlets already defined in PowerShell and you can also define (create) your own custom cmdlets as well as import third-party cmdlets.



# Scripting – Windows PowerShell

- Windows PowerShell is particularly well suited for situations in which there are multiple servers and it is more efficient to manage them using a consistent set of scripts.
- It is also ideal for managing servers with the Application Server role installed in situations where the applications need to be configured the same way and regular updates are applied.
- Windows Server 2008 comes with PowerShell and it can be installed via the Server Manager (it also comes with Windows 7) and it can be easily downloaded into older server versions.



# Scripting – Windows PowerShell

- Some of the more common server administration tasks that can easily be handled through PowerShell include:
  - Managing files and folders (directories).
  - Managing network tasks.
  - Managing fixed and removable storage devices.
  - Configuring printing services.
  - Managing software applications and updates.
  - Managing Terminal Services.
  - Managing server services and features.
  - Managing Web server services
  - Working with the system registry.



# Scripting – Windows PowerShell

- PowerShell is not installed by default in Server 2008 (although it should be in Server 2008 R2 editions).
- To install PowerShell from the Server Manager:
  - Scroll down to the Features Summary.
  - Click Add Features.
  - Under Features, scroll to find Windows PowerShell and check its box.
  - Click Next and then click Install.
  - Click Close.
  - Close the Server Manager.
- The next few screen shots step you through this simple process.



**Server Manager (TESTBEDSERVER)**

File Action View Help

Server Manager (TESTBEDSERVER)

Get an overview of the status of this server, perform top management tasks, and add or remove server roles and features.

**Features Summary**

**Features:** 1 of 35 installed

- .NET Framework 3.0 Features
- .NET Framework 3.0
- XPS Viewer

**Resources and Support**

Help make Windows Server better by participating in the Customer Experience Improvement Program (CEIP)

Report issues to Microsoft and get solutions to common problems by turning on Windows Error Reporting.

Browse technical resources for Windows Server, including how-to help, guides, web casts, and tools.

Last Refresh: 3/15/2012 2:34:09 PM [Configure refresh](#)



**Add Features Wizard**

### Select Features

Select one or more features to install on this server.

Features:

- Remote Assistance
- Remote Differential Compression
- Remote Server Administration Tools
  - Removable Storage Manager
  - RPC over HTTP Proxy
  - Simple TCP/IP Services
  - SMTP Server
- SNMP Services
  - Storage Manager for SANs
  - Subsystem for UNIX-based Applications
  - Telnet Client
  - Telnet Server
  - TFTP Client
  - Windows Internal Database
- Windows PowerShell**
- Windows Process Activation Service
- Windows Server Backup Features
  - Windows System Resource Manager
  - WinRM IIS Extension
- WINS Server
- Wireless LAN Service

Description: [Windows PowerShell](#) is a command-line shell and scripting language that helps IT professionals achieve greater productivity. The new administrator-focused scripting language and more than 130 standard command-line tools enable easier system administration and accelerated automation.

[More about features](#)

< Previous   **Next >**   Install   Cancel

1. Check the Windows PowerShell checkbox.  
2. Then click Next.





### Add Features Wizard

## Confirm Installation Selections

To install the following roles, role services, or features, click Install.

1 informational message below

This server might need to be restarted after the installation completes.

**Windows PowerShell**

[Print, e-mail, or save this information](#)


< Previous    Next >    **Install**    Cancel



### Add Features Wizard

## Installation Results

The following roles, role services, or features were installed successfully:


<b>Windows PowerShell</b>	 <b>Installation succeeded</b>
---------------------------	---

[Print, e-mail, or save the installation report](#)

< Previous    Next >    **Close**    Cancel

Start | Server Manager | 2:26 PM

To direct input to this virtual machine, press Ctrl+G.



Click Close after successful installation



The screenshot displays the Windows Server Manager console for a server named TESTBEDSERVER. The left-hand navigation pane shows a tree view with categories: Roles, Features, Diagnostics, Configuration, and Storage. The main area is titled 'Server Manager (TESTBEDSERVER)' and contains a 'Features Summary' section. Under 'Features Summary', it indicates 'Features: 2 of 35 installed' and lists the following installed features: .NET Framework 3.0 Features, .NET Framework 3.0, XPS Viewer, and Windows PowerShell. A red box highlights the text 'Back in Server Manager, the new feature lists under the installed features on this server.' with a red arrow pointing to 'Windows PowerShell' in the list. Other sections include 'Resources and Support' with links for CEIP, Error Reporting, and TechCenter. The taskbar at the bottom shows the Start button, several application icons, and the Server Manager window title. The system tray on the right shows the time as 2:40 PM and the VMware logo.

Back in Server Manager, the new feature lists under the installed features on this server.



# Scripting – Windows PowerShell

- Once you've installed PowerShell on the server, you're reading to take advantage of some of the cmdlets.
- With PowerShell installed, you should be able to find it on the server under the Start menu, click All Programs, click Accessories, Click Windows PowerShell, and Windows PowerShell should be there (see the next page).
  - Note: there will also be a Windows PowerShell ISE, which is the Integrated Scripting Environment. We'll look at this later.
- Once you click on Windows PowerShell, you should see a screen like the one shown on page 14.



- Internet Explorer
- Opera
- Windows Contacts
- Windows Update
- Accessories
  - Calculator
  - Command Prompt
  - Notepad
  - Paint
  - Remote Desktop Connection
  - Run
  - Windows Explorer
  - WordPad
  - Ease of Access
  - System Tools
  - Windows PowerShell
    - Windows PowerShell
    - Windows PowerShell ISE
- Administrative Tools
- Apache HTTP Server 2.2
- Apache Tomcat 7.0 Tomcat7.0.22
- Apache Tomcat 7.0 Tomcat7.0.25
- Extras and Upgrades
- Maintenance
- Microsoft .NET Framework SDK v2.0
- MySQL
- Notepad++
- PHP 5

- Administrator
- Documents
- Computer
- Network
- Control Panel
- Administrative Tools
- Help and Support
- Run...

You'll find PowerShell under the Accessories list from the Start, All Programs listing

Back

Start Search



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

PS C:\Users\Administrator> _
```

This is the default appearance with the window maximized. To change this setting see pages 43-44.

Start | Administrator: Windo... | vmware | 2:30 PM

To direct input to this virtual machine, press Ctrl+G.



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

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

Start | Administrator: Windo... | 2:50 PM

To direct input to this virtual machine, press Ctrl+G.

vmware

# Scripting – Windows PowerShell

- To view the files in the current folder (the default folder will be the Users/Administrator folder), one page of files at a time, enter the command:

```
dir | more
```

- Press Enter after typing in the command (pressing the spacebar will give you the next page if there is one – probably not on our servers, since we don't have much out there yet).
- What you're doing here is executing the directory command and piping its output through to the more command which displays input one page at a time.
- The next page shows the execution of this command on one of my virtual servers.





Administrator: Windows PowerShell

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

PS C:\users\Administrator> **dir | more**

Directory: C:\users\Administrator

Mode	LastWriteTime	Length	Name
d----	10/3/2011 10:13 AM		.grasp_settings
d----	11/16/2011 4:41 PM		.idlerc
d----	3/15/2012 11:28 AM		.m2
d-r--	9/21/2011 5:02 PM		Contacts
d-r--	2/22/2012 2:15 PM		Desktop
d-r--	3/1/2012 8:21 AM		Documents
d-r--	2/22/2012 2:16 PM		Downloads
d-r--	9/21/2011 5:02 PM		Favorites
d-r--	9/21/2011 5:02 PM		Links
d-r--	9/21/2011 5:02 PM		Music
d----	11/16/2011 12:15 PM		MyScripts
d-r--	9/21/2011 5:02 PM		Pictures
d----	11/16/2011 4:30 PM		Python Scripts
d-r--	9/21/2011 5:02 PM		Saved Games
d-r--	9/21/2011 5:02 PM		Searches
d-r--	9/21/2011 5:02 PM		Videos
d----	11/29/2011 4:41 PM		workspace

PS C:\users\Administrator> \_

Start Administrator: Windo...

2:50 PM

To direct input to this virtual machine, press Ctrl+G.



# Scripting – Windows PowerShell

- To get a listing of the services currently running on your server, enter the command `get-service`, at the command prompt. A partial listing of the output of this cmdlet is shown on page 19.
- To view a listing of all the currently defined cmdlets, enter the command `get-command | more`, at the command prompt. Here you will see the cmdlets one screen at a time, so press the spacebar to advance to the next screen. Simply repeat this until you've seen all the pages, or alternatively, press `q`, to quite and exit back to the command line if you don't want to view all the pages. This command is illustrated on page 20.



Administrator: Windows PowerShell

PS C:\users\Administrator> **get-service**

Status	Name	DisplayName
Running	AeLookupSvc	Application Experience
Stopped	ALG	Application Layer Gateway Service
Stopped	Apache2.2	Apache2.2
Stopped	Appinfo	Application Information
Stopped	AppMgmt	Application Management
Stopped	AudioEndpointBu...	Windows Audio Endpoint Builder
Stopped	Audiosrv	Windows Audio
Running	BFE	Base Filtering Engine
Running	BITS	Background Intelligent Transfer Ser...
Stopped	Browser	Computer Browser
Stopped	CertPropSvc	Certificate Propagation
Stopped	clr_optimizatio...	Microsoft .NET Framework NGEN v2.0....
Stopped	clr_optimizatio...	Microsoft .NET Framework NGEN v4.0....
Running	COMSysApp	COM+ System Application
Running	CryptSvc	Cryptographic Services
Stopped	CscService	Offline Files
Running	DcomLaunch	DCOM Server Process Launcher
Running	Dhcp	DHCP Client
Running	Dnscache	DNS Client
Stopped	dot3svc	Wired AutoConfig
Running	DPS	Diagnostic Policy Service
Stopped	EapHost	Extensible Authentication Protocol
Running	EventLog	Windows Event Log
Running	EventSystem	COM+ Event System
Stopped	FCRegSvc	Microsoft Fibre Channel Platform Re...
Stopped	fdPHost	Function Discovery Provider Host
Running	FDResPub	Function Discovery Resource Publica...
Running	FontCache	Windows Font Cache Service
Stopped	FontCache3.0.0.0	Windows Presentation Foundation Fon...
Running	gpsvc	Group Policy Client
Stopped	hidserv	Human Interface Device Access
Stopped	hkmsvc	Health Key and Certificate Management
Stopped	idsvc	Windows CardSpace
Running	IKEEXT	IKE and AuthIP IPsec Keying Modules
Stopped	IPBusEnum	PnP-X IP Bus Enumerator
Running	iphlpvc	IP Helper
Stopped	KeyIso	CNG Key Isolation
Running	KtmRm	KtmRm for Distributed Transaction C...
Running	LanmanServer	Server
Running	LanmanWorkstation	Workstation

Start | Administrator: Windo...

2:51 PM

To direct input to this virtual machine, press Ctrl+G.



Administrator: Windows PowerShell

PS C:\users\Administrator> **get-command | more**

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> [-Credenti
Cmdlet	Add-Content	Add-Content [-Path] <String[]> [-Value] <Objec
Cmdlet	Add-History	Add-History [[-InputObject] <PSObject[]>] [-Pa
Cmdlet	Add-Member	Add-Member [-MemberType] <PSMemberTypes> [-Nam
Cmdlet	Add-PSSnapin	Add-PSSnapin [-Name] <String[]> [-PassThru] [-
Cmdlet	Add-Type	Add-Type [-TypeDefinition] <String> [-Language
Alias	asn	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] <String> [[
Alias	clc	Clear-Content
Alias	clear	Clear-Host
Cmdlet	Clear-Content	Clear-Content [-Path] <String[]> [-Filter <Str
Cmdlet	Clear-EventLog	Clear-EventLog [-LogName] <String[]> [[-Comput
Cmdlet	Clear-History	Clear-History [[-Id] <Int32[]>] [[-Count] <Int
Function	Clear-Host	\$space = New-Object System.Management.Automati
Cmdlet	Clear-Item	Clear-Item [-Path] <String[]> [-Force] [-File
Cmdlet	Clear-ItemProperty	Clear-ItemProperty [-Path] <String[]> [-Name]
Cmdlet	Clear-Variable	Clear-Variable [-Name] <String[]> [-Include <S
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] <PSObject[]>
Cmdlet	Complete-Transaction	Complete-Transaction [-Verbose] [-Debug] [-Err
Cmdlet	Connect-WSMan	Connect-WSMan [[-ComputerName] <String>] [-App
Cmdlet	ConvertFrom-Csv	ConvertFrom-Csv [-InputObject] <PSObject[]> [[
Cmdlet	ConvertFrom-SecureString	ConvertFrom-SecureString [-SecureString] <Secu
Cmdlet	ConvertFrom-StringData	ConvertFrom-StringData [-StringData] <String>

Start Administrator: Windo...

2:58 PM

To direct input to this virtual machine, press Ctrl+G.



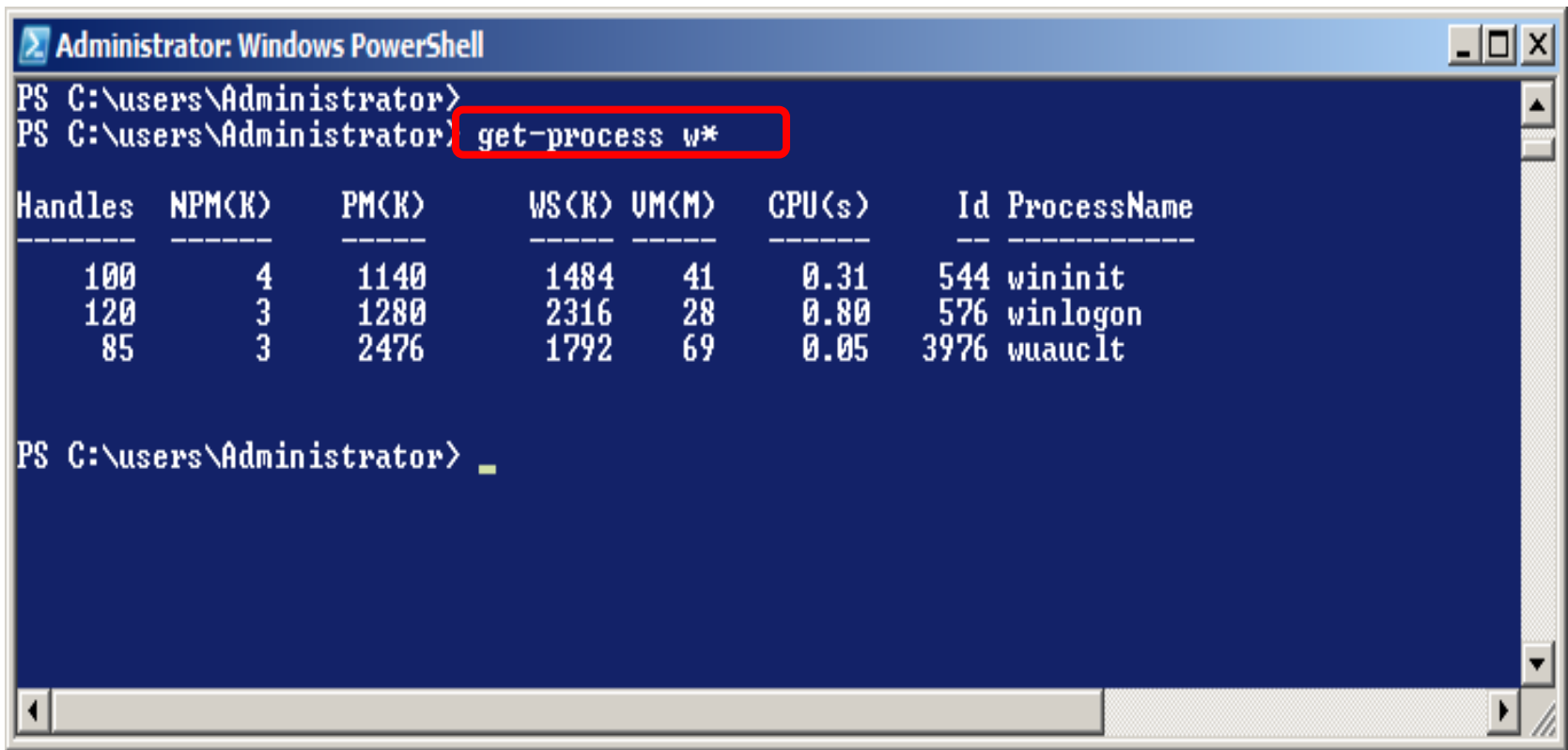
# Scripting – Windows PowerShell

- One big plus of PowerShell is consistency. With many shells, the commands can vary in complexity; however, given the object-oriented nature of PowerShell, most cmdlets are fairly basic in their usage and are highly consistent.
- The power comes in using combinations of cmdlets.
- The cmdlets naming convention is for the first part to be a verb (for example, `get-`, `format-`, `out-`, or `set-`) that dictates what the cmdlet does (such as get information, format information, direct information, or set information).
- The next part is a noun, which specifies what is being acted on.



# Scripting – Windows PowerShell

- Everything is based around this verb-noun pair; for example, `get-process w*` retrieves information about processes whose names start with the letter w, as shown below.



The screenshot shows a Windows PowerShell console window titled "Administrator: Windows PowerShell". The prompt is "PS C:\users\Administrator>". The command "get-process w\*" is entered and highlighted with a red box. The output is a table of process information:

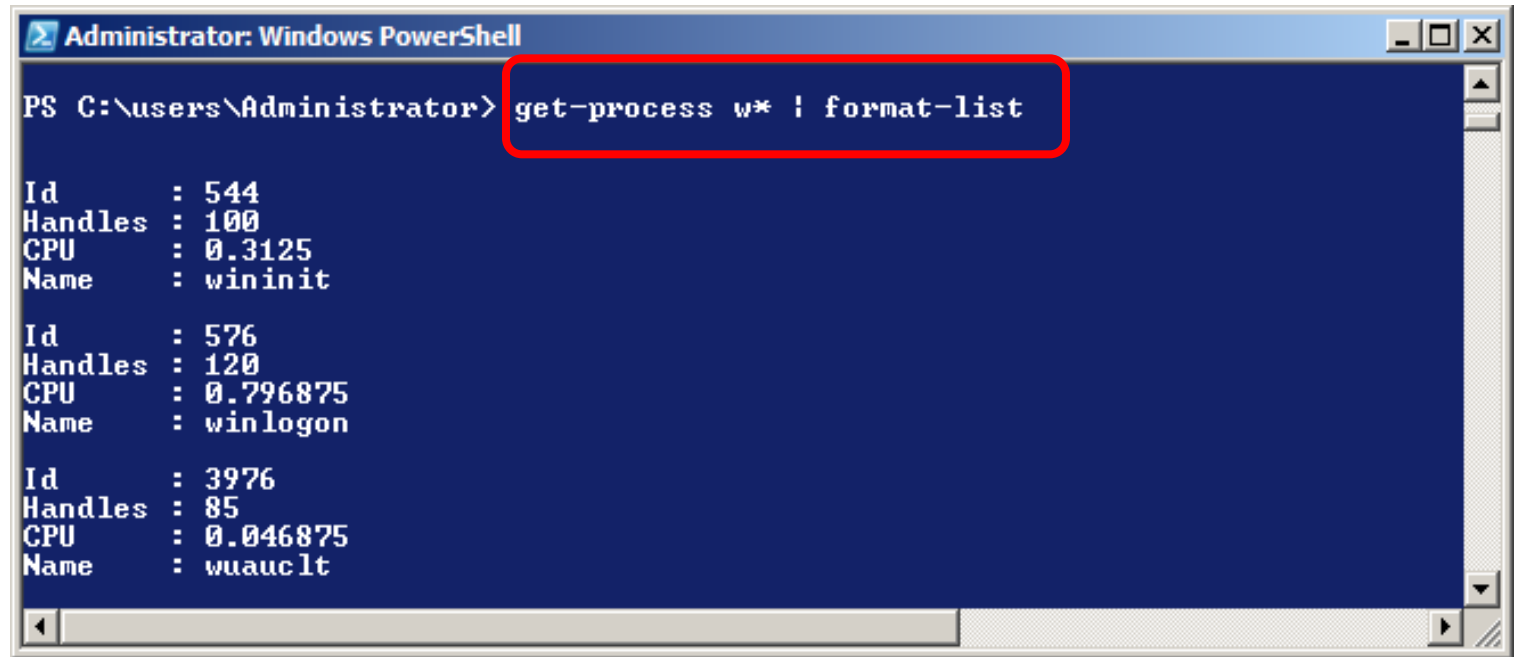
Handles	NPM(K)	PM(K)	WS(K)	UM(M)	CPU(s)	Id	ProcessName
100	4	1140	1484	41	0.31	544	wininit
120	3	1280	2316	28	0.80	576	winlogon
85	3	2476	1792	69	0.05	3976	wuauclt

The prompt is now "PS C:\users\Administrator> \_".



# Scripting – Windows PowerShell

- Although the output, as shown on the previous page, is tabular, this is not how the data is returned in PowerShell. It's referenced in its .NET object format, but the default display format is a table.
- You can easily output in other formats, such as a list by piping the output of the `get-process` cmdlet to the `format-list` cmdlet.



```
Administrator: Windows PowerShell
PS C:\users\Administrator> get-process w* | format-list

Id      : 544
Handles : 100
CPU     : 0.3125
Name    : wininit

Id      : 576
Handles : 120
CPU     : 0.796875
Name    : winlogon

Id      : 3976
Handles : 85
CPU     : 0.046875
Name    : wuauc lt
```



# Scripting – Windows PowerShell

- Probably the greatest cmdlet (as well as the best verb-noun combination) that you'll ever use is `get-help`.
- On its own, `get-help` gives you just basic information, but it can show you the names of other cmdlets, so you can get detailed help on them.
- For example, `get-help format-*` will list all the cmdlets starting with `format-` to help you see the options available to you.





Administrator: Windows PowerShell

PS C:\users\Administrator> **get-help format-\***

<u>Name</u>	<u>Category</u>	<u>Synopsis</u>
Format-List	Cmdlet	Formats the output as a list of properties in which each property appe
Format-Custom	Cmdlet	Uses a customized view to format the output.
Format-Table	Cmdlet	Formats the output as a table.
Format-Wide	Cmdlet	Formats objects as a wide table that displays only one property of eac

PS C:\users\Administrator>

Start | Administrator: Windo... | 3:07 PM

To direct input to this virtual machine, press Ctrl+G.

vmware

# Scripting – Windows PowerShell

- In addition to getting detailed help about a cmdlet, use the `get-help` command with the name of the cmdlet followed by `-detailed` to get all available help.
- Add `-full` to just view a portion of the help, or add `-examples` to have examples of use listed for you.
- Note that when the `-detailed` option is selected, the examples are also listed.
- The following screen shots illustrates these cases. Note that the detailed case requires several pages of output and I only show the first one here. The same is often true for full and examples.



```

Administrator: Windows PowerShell
PS C:\users\Administrator> get-help format-list -detailed

NAME
    Format-List

SYNOPSIS
    Formats the output as a list of properties in which each property appears on a new line.

SYNTAX
    Format-List [[-Property] <Object[]>] [-DisplayError] [-Expand <string>] [-Force] [-GroupBy <Object>] [-InputOb
    <psobject>] [-ShowError] [-View <string>] [CommonParameters]

DESCRIPTION
    The Format-List cmdlet formats the output of a command as a list of properties in which each property is displ
    on a separate line. You can use Format-List to format and display all or selected properties of an object as a
    (<format-list *>).

    Because more space is available for each item in a list than in a table, Windows PowerShell displays more prop
    s of the object in the list, and the property values are less likely to be truncated.

PARAMETERS
    -DisplayError [SwitchParameter]
        Displays errors at the command line.

    -Expand <string>
        Formats the collection object, as well as the objects in the collection. This parameter is designed to for
        bjects that support the ICollection (System.Collections) interface. The default value is EnumOnly.

        Valid values are:
        -- EnumOnly: Displays the properties of the objects in the collection.
        -- CoreOnly: Displays the properties of the collection object.
        -- Both: Displays the properties of the collection object and the properties of objects in the collection.

    -Force [SwitchParameter]
        Directs the cmdlet to display all of the error information. Use with the DisplayError or ShowError paramet
        By default, when an error object is written to the error or display streams, only some of the error inform
        is displayed.

    -GroupBy <Object>
        Formats the output in groups based on a shared property or value. Enter an expression or a property of the
        ut.
  
```

Start | Administrator: Windo... | 3:08 PM | vmware

To direct input to this virtual machine, press Ctrl+G.

Administrator: Windows PowerShell

PS C:\users\Administrator> **get-help format-list -examples**

NAME  
Format-List

SYNOPSIS

Formats the output as a list of properties in which each property appears on a new line.

----- EXAMPLE 1 -----

C:\PS>get-service | format-list

Description

This command formats information about services on the computer as a list. By default, the services are formatted as a table. The Get-Service cmdlet gets objects representing the services on the computer. The pipeline operator passes the results through the pipeline to Format-List. Then, the Format-List command formats the service information in a list and sends it to the default output cmdlet for display.

----- EXAMPLE 2 -----

C:\PS>\$a = get-childitem \$pshome\\*.ps1xml

Description

These commands display information about the PS1XML files in the Windows PowerShell directory as a list. The first command gets the objects representing the files and stores them in the \$a variable. The second command uses Format-List to format information about objects stored in \$a. This command uses the InputObject parameter to pass the objects to Format-List, which then sends the formatted output to the default output cmdlet for display.

----- EXAMPLE 3 -----

C:\PS>get-process | format-list -property name, basepriority, priorityclass

Description

Windows taskbar and VMware interface showing Start button, Administrator: Windows PowerShell window, system tray with VMware logo, and time 3:09 PM.

# Scripting – Windows PowerShell

- We've already seen the cmdlet `get-command`. If you want to see all the commands that begin with a certain verb, such as `get`, issue the command `get-command -verb get`.
- The output of this command is shown on the next page, but you might want to experiment a bit and try out some other options. For example, try listing all of the commands that use the verbs `add` or `new`.



Administrator: Windows PowerShell

PS C:\users\Administrator> **get-command -verb get**

CommandType	Name	Definition
Cmdlet	Get-Acl	Get-Acl [[-Path] <String[]>] [-Audit] [-Filter
Cmdlet	Get-Alias	Get-Alias [[-Name] <String[]>] [-Exclude <Stri
Cmdlet	Get-AuthenticodeSignature	Get-AuthenticodeSignature [-FilePath] <String[
Cmdlet	Get-ChildItem	Get-ChildItem [[-Path] <String[]>] [[-Filter]
Cmdlet	Get-Command	Get-Command [[-ArgumentList] <Object[]>] [-Ver
Cmdlet	Get-ComputerRestorePoint	Get-ComputerRestorePoint [[-RestorePoint] <Int
Cmdlet	Get-Content	Get-Content [-Path] <String[]> [-ReadCount <In
Cmdlet	Get-Counter	Get-Counter [[-Counter] <String[]>] [-SampleIn
Cmdlet	Get-Credential	Get-Credential [-Credential] <PSCredential> [-
Cmdlet	Get-Culture	Get-Culture [-Verbose] [-Debug] [-ErrorAction
Cmdlet	Get-Date	Get-Date [[-Date] <DateTime>] [-Year <Int32>]
Cmdlet	Get-Event	Get-Event [[-SourceIdentifier] <String>] [-Ver
Cmdlet	Get-EventLog	Get-EventLog [-LogName] <String> [[-InstanceId
Cmdlet	Get-EventSubscriber	Get-EventSubscriber [[-SourceIdentifier] <Stri
Cmdlet	Get-ExecutionPolicy	Get-ExecutionPolicy [-Scope] <ExecutionPolicy
Cmdlet	Get-FormatData	Get-FormatData [[-TypeName] <String[]>] [-Verb
Cmdlet	Get-Help	Get-Help [[-Name] <String>] [-Path <String>] [
Cmdlet	Get-History	Get-History [[-Id] <Int64[]>] [[-Count] <Int32
Cmdlet	Get-Host	Get-Host [-Verbose] [-Debug] [-ErrorAction <Ac
Cmdlet	Get-HotFix	Get-HotFix [[-Id] <String[]>] [-ComputerName <
Cmdlet	Get-Item	Get-Item [-Path] <String[]> [-Filter <String>]
Cmdlet	Get-ItemProperty	Get-ItemProperty [-Path] <String[]> [[-Name] <
Cmdlet	Get-Job	Get-Job [[-Id] <Int32[]>] [-Verbose] [-Debug]
Cmdlet	Get-Location	Get-Location [-PSPProvider <String[]>] [-PSDriv
Cmdlet	Get-Member	Get-Member [[-Name] <String[]>] [-InputObject
Cmdlet	Get-Module	Get-Module [[-Name] <String[]>] [-All] [-Verbo
Cmdlet	Get-PfxCertificate	Get-PfxCertificate [-FilePath] <String[]> [-U
Cmdlet	Get-Process	Get-Process [[-Name] <String[]>] [-ComputerNam
Cmdlet	Get-PSBreakpoint	Get-PSBreakpoint [[-Script] <String[]>] [-Verb
Cmdlet	Get-PSCallStack	Get-PSCallStack [-Verbose] [-Debug] [-ErrorAct
Cmdlet	Get-PSDrive	Get-PSDrive [[-Name] <String[]>] [-Scope <Stri
Cmdlet	Get-PSProvider	Get-PSProvider [[-PSProvider] <String[]>] [-U
Cmdlet	Get-PSSession	Get-PSSession [[-ComputerName] <String[]>] [-U
Cmdlet	Get-PSSessionConfiguration	Get-PSSessionConfiguration [[-Name] <String[]>
Cmdlet	Get-PSSnapin	Get-PSSnapin [[-Name] <String[]>] [-Registered
Cmdlet	Get-Random	Get-Random [[-Maximum] <Object>] [-SetSeed <Nu
Cmdlet	Get-Service	Get-Service [[-Name] <String[]>] [-ComputerNam
Cmdlet	Get-TraceSource	Get-TraceSource [[-Name] <String[]>] [-Verbose
Cmdlet	Get-Transaction	Get-Transaction [-Verbose] [-Debug] [-ErrorAct
Cmdlet	Get-UICulture	Get-UICulture [-Verbose] [-Debug] [-ErrorActio

Windows taskbar area showing Start button, system tray with VMware icon, and the time 3:10 PM. Below the taskbar is a VMware toolbar with icons for various functions and the VMware logo.



# Scripting – Windows PowerShell

- Now that you've have some basic familiarity with PowerShell, let's do something more useful with it... let's try starting and stopping a process.
  - What you might want to do before going any further is first run the `get-help *-process` to list all the available commands that deal with a process. You should discover that there are five of these cmdlets.
- What we're going to do over the next few pages is start Notepad as a process running on our server and then use it and then stop the process. This will be illustrated by a sequence of screen shots from the server illustrating what is happening.
- First off, we'll see a screen shot of the current processes on the server. Notice that its alphabetically listed and Notepad is not running (Notepad++ is on my server).



Administrator: Windows PowerShell

PS C:\users\Administrator> get-process

Handles	NPM(K)	PM(K)	WS(K)	VM(M)	CPU(s)	Id	ProcessName
405	5	1680	2544	105	1.19	492	csrss
210	7	7112	5472	51	17.34	536	csrss
230	7	5700	2832	68	0.44	2552	dllhost
79	3	1212	2732	45	0.72	2276	dwm
531	14	22388	27676	164	42.33	2300	explorer
0	0	0	24	0		0	Idle
201	6	3244	3368	63	0.14	2092	jucheck
209	6	2372	2988	69	0.28	3048	jusched
588	9	3204	4748	45	2.23	636	lsass
159	3	1596	2152	29	0.22	644	lsm
162	7	2812	2472	60	0.28	2740	msdtc
516	6	50612	25136	101	0.50	3284	mysqld
89	5	7100	11436	66	0.50	2220	notepad++
368	8	48348	50692	182	2.77	3300	powershell
243	7	2388	3808	37	13.55	624	services
96	3	5756	3176	40	1.47	1040	SLsvc
28	1	256	484	4	0.22	424	smss
309	10	7492	5464	100	2.39	1540	spoolsv
300	5	2724	3396	38	7.94	828	svchost
262	7	2640	3292	35	0.73	888	svchost
306	10	6236	5684	50	21.41	964	svchost
148	4	2876	3392	35	0.30	1008	svchost
1053	36	58280	50004	200	37.66	1028	svchost
576	17	6624	5888	60	1.06	1084	svchost
255	8	7320	4884	66	0.73	1148	svchost
431	14	14788	6836	88	4.20	1172	svchost
268	22	6100	5216	47	1.06	1336	svchost
125	5	1860	1352	36	0.14	1792	svchost
73	2	832	944	23	0.05	1804	svchost
81	3	1016	1388	23	0.20	1936	svchost
228	7	3220	1684	44	0.11	3096	svchost
64	2	1284	1508	25	0.11	3720	svchost
513	0	0	728	4		4	System
137	5	1868	2156	53	0.25	1448	taskeng
254	7	2816	4632	74	0.69	2200	taskeng
47	2	1028	752	45	0.03	3068	Tomcat7.0.22w
66	2	1252	2480	49	0.22	3084	Tomcat7.0.25w
111	4	2272	3792	63	22.67	2704	TPAutoConnect
127	4	2304	3488	55	0.36	2380	TPAutoConnSvc
254	7	6384	4968	88	13.44	1860	vmtoolsd

Currently running processes do not include Notepad.

Start Administrator: Windo... new 1 - Notepad++

3:12 PM

To direct input to this virtual machine, press Ctrl+G.





Administrator: Windows PowerShell

588	9	3204	4748	45	2.23	636	lsass
159	3	1596	2152	29	0.22	644	lsm
162	7	2812	2472	60	0.28	2740	msdtc
516	6	50612	25136	101	0.50	3284	musoid

Untitled - Notepad

File Edit Format View Help

254 7 6384 4968 88 13.44 1860 vmtoolsd  
 92 4 2744 2028 46 0.05 2012 VMUpgradeHelper  
 68 3 2480 2328 54 0.30 2940 VMwareTray  
 179 5 10664 10848 103 3.72 2964 VMwareUser  
 100 4 1140 1484 41 0.31 544 wininit  
 120 3 1280 2316 28 0.80 576 winlogon  
 85 3 2476 1792 69 0.05 3976 wuaucld

PS C:\users\Administrator> start notepad  
 PS C:\users\Administrator>

Enter the command: start notepad on the command line and press enter. Notepad immediately launches.



start notepad

Administrator: Windows PowerShell

```
start notepad
get-process
```

Reissue the command get-process and notice that now Notepad is listed.

Notice too in the tool tray that the you can still see Notepad is there.

Handles	NPM(K)	PM(K)	WS(K)	VM(K)	CPU(s)	Id	ProcessName
398	5	1680	2544	105	1.19	492	csrss
214	7	7112	5480	51	17.53	536	csrss
230	7	5700	2832	68	0.44	2552	dllhost
79	3	1212	2732	45	0.72	2276	dwm
532	14	22388	27672	164	42.34	2300	explorer
0	0	0	24	0		0	Idle
201	6	3244	3368	63	0.14	2092	jucheck
209	6	2372	2988	69	0.28	3048	jusched
589	9	3060	4620	44	2.23	636	lsass
159	3	1596	2152	29	0.22	644	lsn
162	7	2812	2472	60	0.28	2740	msdtc
516	6	50612	25136	101	0.52	3284	mysqld
47	2	1044	3444	47	0.03	3680	notepad
84	5	7080	11424	65	0.50	2220	notepad++
449	8	48548	51512	186	2.94	3300	powershell
243	7	2388	3808	37	13.55	624	services
96	3	5756	3176	40	1.47	1040	SLsvc
28	1	256	484	4	0.22	424	smss
309	10	7492	5464	100	2.39	1540	spoolsv
298	4	2696	3372	38	7.94	828	svchost
260	7	2616	3280	35	0.73	888	svchost
312	10	6264	5700	50	21.42	964	svchost
148	4	2876	3392	35	0.30	1008	svchost
1051	36	58224	49984	199	37.66	1028	svchost
573	17	6620	5872	60	1.06	1084	svchost
255	8	7320	4884	66	0.73	1148	svchost
428	14	14748	6824	88	4.20	1172	svchost
268	22	6128	5228	47	1.06	1336	svchost
125	5	1860	1352	36	0.14	1792	svchost
73	2	832	944	23	0.05	1804	svchost
81	3	1016	1388	23	0.20	1936	svchost
228	7	3220	1684	44	0.11	3096	svchost
64	2	1284	1508	25	0.11	3720	svchost
513	0	0	728	4		4	System
137	5	1868	2156	53	0.25	1448	taskeng
253	7	2796	4620	74	0.69	2200	taskeng
47	2	1028	752	45	0.03	3068	Tomcat7.0.22w
66	2	1252	2480	49	0.22	3084	Tomcat7.0.25w
111	4	2272	3792	63	22.73	2704	TPAutoConnect

Start | Administrator: Windo... | new 1 - Notepad++ | Untitled - Notepad

To direct input to this virtual machine, press Ctrl+G.

Administrator: Windows PowerShell

```
PS C:\users\Administrator> stop-process -id 3680
PS C:\users\Administrator> get-process
```

Handles	NPM(K)	PM(K)	WS(K)	UM(K)	CPU(s)	Id	ProcessName
397	5	1680	2544	105	1.19	492	csrss
210	7	7112	5468	51	17.70	536	csrss
230	7	5700	2832	68	0.44	2552	dllhost
79	3	1212	2732	45	0.72	2276	dwm
525	14	22312	27616	164	42.34	2300	explorer
0	0	0	24	0		0	Idle
201	6	3244	3368	63	0.14	2092	jucheck
209	6	2372	2988	69	0.28	3048	jusched
588	9	3060	4620	44	2.23	636	lsass
159	3	1596	2152	29	0.22	644	lsm
162	7	2812	2472	60	0.28	2740	msdtc
516	6	50612	25136	101	0.52	3284	mysqld
84	5	7080	11424	65	0.50	2220	notepad++
397	8	49956	52864	186	3.03	3300	powershell
243	7	2388	3808	37	13.55	624	services
96	3	5756	3176	40	1.47	1040	SLsvc
28	1	256	484	4	0.22	424	smss
309	10	7492	5464	100	2.39	1540	spoolsv
298	4	2696	3372	38	7.94	828	svchost
258	7	2584	3264	34	0.73	888	svchost
299	10	6236	5684	50	21.42	964	svchost
148	4	2876	3392	35	0.30	1008	svchost
1051	36	58252	49996	200	37.66	1028	svchost
572	17	6620	5872	60	1.06	1084	svchost
255	8	7320	4884	66	0.73	1148	svchost
425	14	14788	6840	88	4.20	1172	svchost
266	22	6100	5216	47	1.06	1336	svchost
125	5	1860	1352	36	0.14	1792	svchost
73	2	832	944	23	0.05	1804	svchost
81	3	1016	1388	23	0.20	1936	svchost
228	7	3220	1684	44	0.11	3096	svchost
64	2	1284	1508	25	0.11	3720	svchost
512	0	0	728	4		4	System
137	5	1868	2156	53	0.25	1448	taskeng
254	7	2816	4632	74	0.70	2200	taskeng
47	2	1028	752	45	0.03	3068	Tomcat7.0.22w
66	2	1252	2480	49	0.22	3084	Tomcat7.0.25w
111	4	2272	3792	63	22.81	2704	TPAutoConnect

Notice on the previous screen shot that the id process id of the Notepad process was 3680. This is used in this version of the stop-process command to identify the process to be stopped.

Reissue the command get-process and notice that now Notepad is no longer listed.

Notice too in the tool tray that Notepad is no longer there.

Start Administrator: Windo... new 1 - Notepad++

3:15 PM

To direct input to this virtual machine, press Ctrl+G.



# Scripting – Windows PowerShell

- You can also do a fair amount of customization of the PowerShell interface.
- A common system administrator technique is to place scripts in a folder on a server that is frequently backed up. Thus, you might want PowerShell to open up in this default directory.
- To illustrate doing this, let's create a subdirectory in the C:\Users\Administrators folder named MyScripts. Then we'll configure PowerShell to open in this folder.
- To make some of these repetitive steps easier to accomplish, I also created a short-cut to PowerShell and put it on the start menu.



# Scripting – Windows PowerShell

- To set-up the default folder for PowerShell to open in, right click the short-cut to PowerShell and select Properties.
- Locate the ShortCut tab on the Properties dialog box and in the Start in: text box enter the path to the new directory “C:\Users\Administrator\MyScripts”, then click OK.
- Restart PowerShell and you should now see the new default directory loaded.



Recycle Bin

- Services
- Command Prompt
- Internet Explorer
- Notepad
- Windows Explorer
- MySQL Workbench
- Windows Powerch...
- Monitor Tomcat
- Notepad++
- Ease of Access Center
- MySQL Workbench 5.2 CE
- All Programs

Open

- Open file location
- Run as administrator
- Edit with Notepad++
- Pin to Start Menu
- Add to Quick Launch
- Restore previous versions
- Send To
- Copy
- Remove from this list
- Rename
- Properties

Administrator

Documents

Computer

Network

Control Panel

Administrative Tools

Help and Support

Run...

Start Search



Start | new 1 - Notepad++ | 3:05 PM

To direct input to this virtual machine, press Ctrl+G.

vmware





**Windows PowerShell Properties**

Compatibility | Security | Details | Previous Versions  
 General | Shortcut | Options | Font | Layout | Colors

Windows PowerShell

Target type: Application  
 Target location: v1.0  
 Target:   
 Start in:   
 Shortcut key:   
 Run:   
 Comment:



```
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) 2007 Microsoft Corporation. All rights reserved.
PS C:\users\Administrator\MyScripts> -
```



# Scripting – Windows PowerShell

- You can also change the text size and the screen foreground and background colors and many other features including hot-keys and so on in PowerShell.
- The next part simply shows you how to reset the text size and the screen colors to customize your PowerShell environment.
- Again going through the desktop shortcut to PowerShell, right click on the short cut and select Properties. Locate the Font tab on the Properties dialog box and reset the Window size to 8x8 (the default is 8x12), then click OK.
- Restart PowerShell and you should now see the new default screen size and font size for the window.





Recycle Bin

Administrator: Windows PowerShell

```
Windows PowerShell
Copyright (C) 2009 Microsoft Corporation. All rights reserved.
PS C:\users\Administrator\MyScripts> _
```

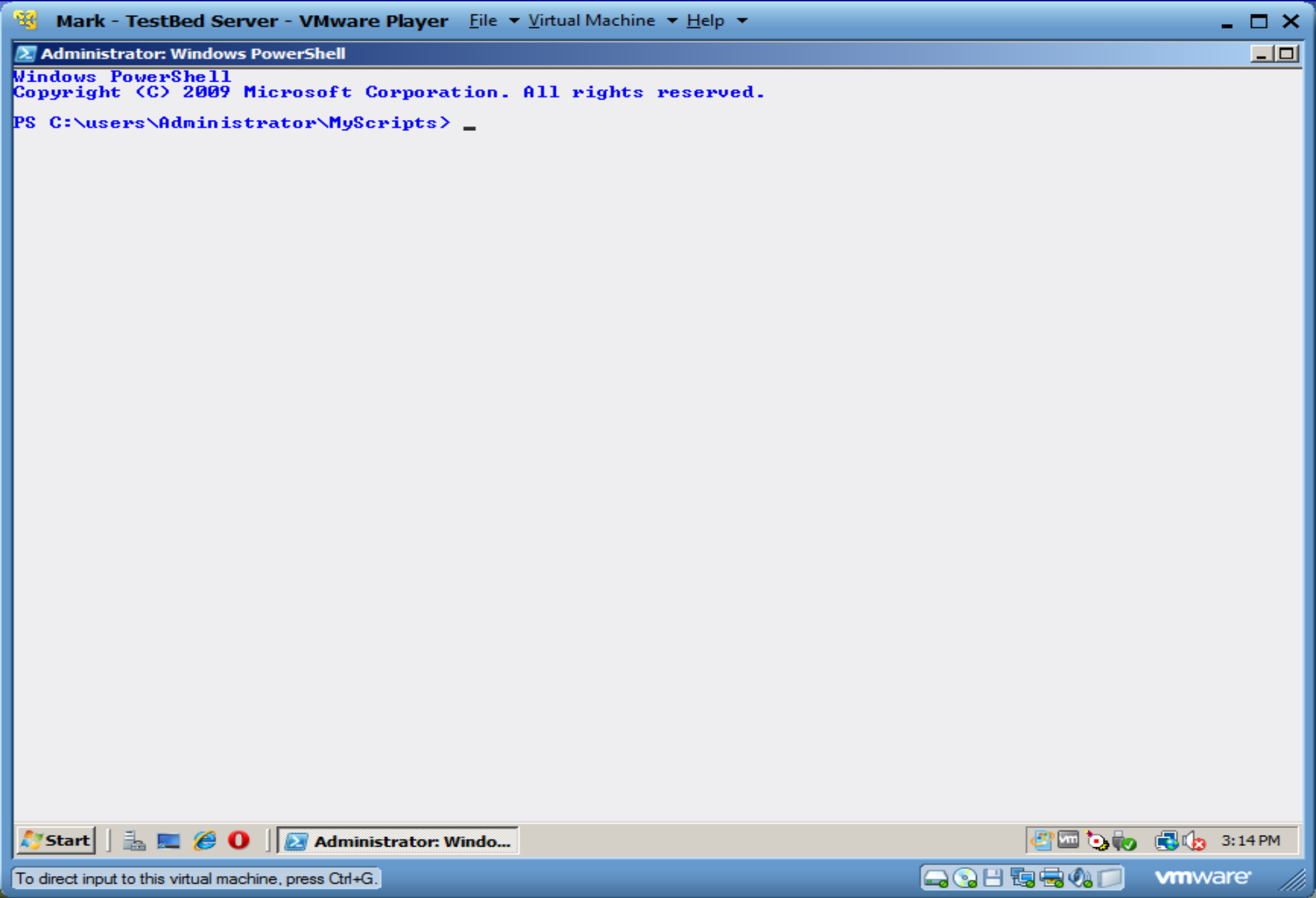
To direct input to this virtual machine, press Ctrl+G.



# Scripting – Windows PowerShell

- To change the screen colors for PowerShell, repeat the process but select the Colors tab.
- Again going through the desktop shortcut to PowerShell, right click on the short cut and select Properties. Locate the Colors tab on the Properties dialog box and reset the colors to your liking, then click OK.
- Restart PowerShell and you should now see the new colors appear.





Administrator: Windows PowerShell

Windows PowerShell  
Copyright (C) 2009 Microsoft Corporation. All rights reserved.  
PS C:\users\Administrator\MyScripts> \_

Start Administrator: Windo...

3:14 PM

To direct input to this virtual machine, press Ctrl+G.

