



PowerShell & PowerCLI Starting from Scratch

India VMUG UserCon
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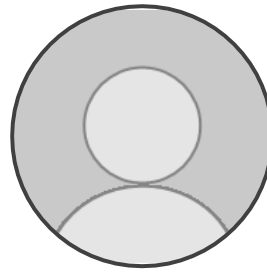


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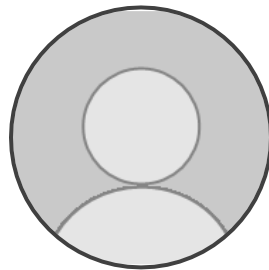
PowerShell (PoSH)

Started as a scripting framework for automation & evolved into a command line interface (CLI) and a scripting language

Native executables, cmdlets, scripts, functions, aliases, modules, help, profiles, parameters, and more



Why use PowerShell?



Versions

.Net Framework



≤ 5.1
Windows

.NET Core



Windows
Linux
MacOS



7.x



Profiles

- ▶ The PowerShell profile is a script that runs when a PowerShell session is started (unless the -nopprofile switch is used)
- ▶ Basically, it is a logon script for PowerShell containing commands, aliases, variables, drives, functions, modules, etc.
- ▶ Profiles can be for all users, the current user, all hosts, and the current host. You can have a mix of none, some, or all of these and there is a precedence order.
- ▶ There is no default profile
- ▶ Your current user profile is stored in the \$profile variable. To edit your current user profile with VSCode, type code \$profile at a PowerShell prompt.



Variables

- ▶ A unit of memory in which a value is stored
- ▶ PowerShell variables are text strings represented by the dollar sign “\$” prefix (ex. \$a, \$my_var, \$var1, etc.)
- ▶ Although special characters and spaces allowed, variable names should be kept simple
- ▶ Types of variables:
 - ▶ User - user defined and deleted on exit (add to your PowerShell Profile to sustain)
 - ▶ Automatic - defined by Posh & not editable (ex. \$PSHOME)
 - ▶ Preference - defaults defined & are user editable
- ▶ Get-Variable to show all variables defined in a session



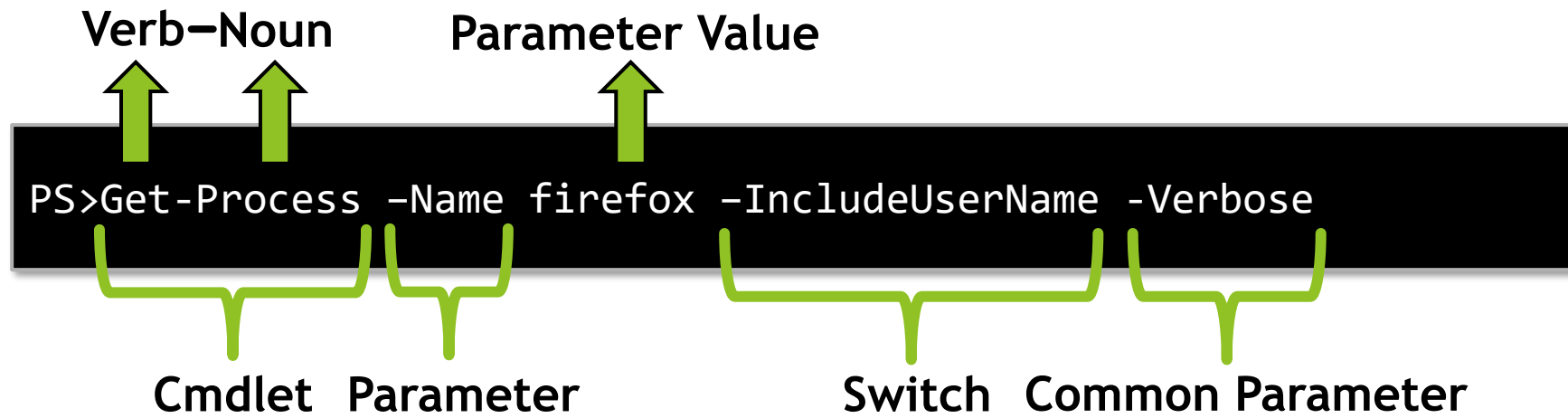
Cmdlets

“command-lets”

- ▶ A type of command in PowerShell
- ▶ Common syntax & options
- ▶ Usually take object input & return objects
- ▶ Stored in .ps1 file for scripts



Syntax



Parameters

Named

Positional

Dynamic

Common

Sets

- ▶ Allow for users to provide input or options
- ▶ A pre-hyphen (“-”) is not always necessary (ie. positional)
- ▶ Some parameters have default values (dev decision)
- ▶ Different Types:
 - ▶ Named -> default full name of parameter
 - ▶ Positional -> typed in a relative order (caution)
 - ▶ Dynamic -> only available under special conditions
 - ▶ Common -> built-in parameters
 - ▶ Sets -> expose different parameters & return different information



Pipelines

Pipeline operator



```
PS>Get-Process -Name firefox -IncludeUserName | Stop-Process
```

Object returned by first cmdlet sent to second cmdlet

“One-liner”



Functions

A list of PowerShell statements that run like you had entered them on the command line

```
function Get-FirefoxProcess { Get-Process firefox }  
  
function Get-FirefoxProcess {  
    $a = Get-Process firefox  
    if ($a -eq $null) {  
        Write-Host "No Firefox process present"}  
    return $a  
}  
  
Get-FirefoxProcess
```



Modules

- **.psm1** file
 - Imported as itself or launched from **.psd1** file (a module manifest file)
 - Commands, providers, variables, functions, help context, aliases, workflows
- Auto-Loading capability
- Stored in \$env:PSModulePath



Creating / Editing / Running

```
Administrator: Windows PowerShell ISE
File Edit View Tools Debug Add-ons Help
bulk-update.ps1 X
13
14 # Create arrays for skipped and failed users
15 $SkippedUsers = @()
16 $FailedUsers = @()
17
18 # Loop through CSV records
19 foreach ($CSVrecord in $CSVrecords) {
20     $supn = $CSVrecord.UserPrincipalName
21     $user = Get-AzureADUser -Filter "userPrincipalName eq '$supn'"
22     if ($user) {
23         try {
24             $user | Set-AzureADUser -Department $CSVrecord.Department -Teleph
25         }
26     }
27 }
28
29 PS C:\> Get-Host
30
31 Name           : Windows PowerShell ISE Host
32 Version        : 5.1.17763.1490
33 InstanceId     : b76947f9-993f-4f21-a072-ab27af7f927f
34 UI             : System.Management.Automation.Internal.Host.InternalHostUserInter
35 CurrentCulture : en-US
36 CurrentUICulture : en-US
37 PrivateData    : Microsoft.PowerShell.Host.ISE.ISEOptions
38 DebuggerEnabled : True
39 IsRunspacePushed : False
40 Runspace       : System.Management.Automation.Runspace.LocalRunspace
41
42 Completed
```

```
Remove-OldModules.ps1 - Visual Studio Code - Insiders
File Edit Selection View Go Run Terminal Help
Remove-OldModules.ps1 X
F: > powershell > Remove-OldModules.ps1 > Remove-OldModules {}
1 reference
1 function Remove-OldModules
2 {
3     $Latest = Get-InstalledModule
4     foreach ($module in $Latest) {
5
6         Write-Verbose -Message "Uninstalling old versions of $($module.Name) [latest is $($module.Version)]" -Verbose
7         Get-InstalledModule -Name $module.Name -AllVersions | Where-Object {$_.Version -ne $module.Version} | Uninstall-Module -Verbose
8     }
9 }
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11 Remove-OldModules
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```

Core Commands to Know

Get-Command

Get-Help

Update-Help

Update-Module

Get-Member

Show-Command



PowerCLI

- Install-Module VMware.PowerCLI
 - -Allow-Clobber, -Force & -SkipPublisherCheck may be necessary

```
Install-Package: The following commands are already available on this system: 'Export-VM, Get-VM, Get-VMHost, Move-VM, New-VM, Remove-VM, Restart-VM, Set-VM, Set-VMHost, Start-VM, Stop-VM, Suspend-VM'. This module 'VMware.VimAutomation.Core' may override the existing commands. If you still want to install this module 'VMware.VimAutomation.Core', use -AllowClobber parameter.
```

- If certificate error, Update-Module will not work
- Cmdlet collisions such as Get-VM
- 800+ cmdlets in 15+ modules
- Set-PowerCLIConfiguration creates PowerCLI_Settings.xml file
 - For Connect-VIServer certificate errors, use -InvalidCertificateAction Ignore



```
# Modules that must be imported into the global environment prior to importing this module
RequiredModules = @(
@{"ModuleName"="VMware.VimAutomation.Sdk";"ModuleVersion"="12.5.0.19093564"}
@{"ModuleName"="VMware.VimAutomation.Common";"ModuleVersion"="12.6.0.19600917"}
@{"ModuleName"="VMware.Vim";"ModuleVersion"="7.0.3.19601056"}
@{"ModuleName"="VMware.VimAutomation.Core";"ModuleVersion"="12.6.0.19601570"}
@{"ModuleName"="VMware.VimAutomation.Srm";"ModuleVersion"="12.6.0.19609133"}
@{"ModuleName"="VMware.VimAutomation.License";"ModuleVersion"="12.0.0.15939670"}
@{"ModuleName"="VMware.VimAutomation.Vds";"ModuleVersion"="12.5.0.19167830"}
@{"ModuleName"="VMware.CloudServices";"ModuleVersion"="12.6.0.19606210"}
@{"ModuleName"="VMware.VimAutomation.Vmc";"ModuleVersion"="12.6.0.19609014"}
@{"ModuleName"="VMware.VimAutomation.Nsxt";"ModuleVersion"="12.5.0.19168180"}
@{"ModuleName"="VMware.VimAutomation.vROps";"ModuleVersion"="12.5.0.19167825"}
@{"ModuleName"="VMware.VimAutomation.Cis.Core";"ModuleVersion"="12.6.0.19601368"}
@{"ModuleName"="VMware.VimAutomation.HorizonView";"ModuleVersion"="12.5.0.19033914"}
@{"ModuleName"="VMware.VimAutomation.Cloud";"ModuleVersion"="12.0.0.15940183"}
@{"ModuleName"="VMware.DeployAutomation";"ModuleVersion"="7.0.3.19599828"}
@{"ModuleName"="VMware.ImageBuilder";"ModuleVersion"="7.0.3.19599828"}
@{"ModuleName"="VMware.VimAutomation.Storage";"ModuleVersion"="12.6.0.19609013"}
@{"ModuleName"="VMware.VimAutomation.StorageUtility";"ModuleVersion"="1.6.0.0"}
@{"ModuleName"="VMware.VumAutomation";"ModuleVersion"="12.1.0.16941488"}
@{"ModuleName"="VMware.VimAutomation.Security";"ModuleVersion"="12.3.0.17833870"}
@{"ModuleName"="VMware.VimAutomation.Hcx";"ModuleVersion"="12.6.0.19606303"}
@{"ModuleName"="VMware.VimAutomation.WorkloadManagement";"ModuleVersion"="12.4.0.18627055"}
@{"ModuleName"="VMware.Sdk.Runtime";"ModuleVersion"="1.0.106.18628394"}
@{"ModuleName"="VMware.Sdk.vSphere";"ModuleVersion"="1.0.104.18678708"}
@{"ModuleName"="VMware.PowerCLI.VCenter";"ModuleVersion"="12.6.0.19600125"}
@{"ModuleName"="VMware.Sdk.Nsx.Policy";"ModuleVersion"="3.2.0.19610335"}
)
```



https://developer.vmware.com/docs/powercli/latest/products/

vmw

VMware Developer Documentation

BETA

API Reference

PowerCLI Reference

← Back Home

VMware PowerCLI Cmdlets

By Products

VMware vSphere and vSAN

VMware Cloud Director

vRealize Operations Manager

VMware Cloud Services

VMware Cloud on AWS

VMware HCX

VMware Horizon

VMware NSX-T Data Center

VMware Site Recovery Manager

Search PowerCLI

VMware PowerCLI Cmdlets by Product

VMware vSphere and vSAN

Provides cmdlets for automated administration of the vSphere environment.

VMware Cloud Director

Provides cmdlets for automating vCloud Director features.

vRealize Operations Manager

Provides cmdlets for automating vRealize Operations Manager features.

VMware Cloud Services

Provides cmdlets for managing VMware Cloud Services.

VMware Cloud on AWS

Provides cmdlets for managing VMware Cloud on AWS features.

VMware HCX

Provides cmdlets for managing VMware HCX features.

VMware Horizon

Provides cmdlets for automating VMware Horizon features.

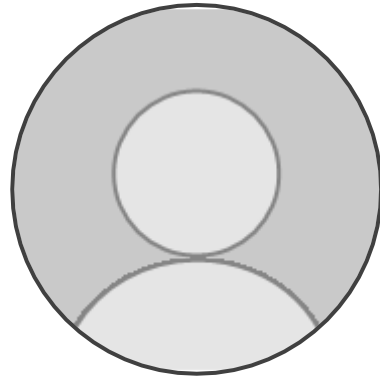
VMware NSX-T Data Center

Provides cmdlets for managing NSX-T servers.

VMware Site Recovery Manager

Provides cmdlets for managing VMware Site Recovery Manager features.

Demos



The background features abstract, overlapping green geometric shapes, primarily triangles and polygons, in various shades of green, creating a modern and dynamic visual effect.

Thank you!

@mikenelsonio