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Make a PowerShell Profile that Runs on any Version or Platform

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Level: Beginner



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Make your PowerShell profile work cross-platform

PowerShell runs across multiple OS platforms and multiple versions on Windows. It can be difficult to manage your profile scripts across the different platforms and versions. Not all features are available on all platforms or in multiple versions.

In this presentation I show you how to create a single profile script that's version and platform aware, and configures your PowerShell environments the same across all platforms.

Profile basics



Profile basics

In PowerShell, the profile script is used to customize the shell environment and define functions, aliases, and variables. The profile is a PowerShell script file that is executed when you start a PowerShell session, whether it's an interactive session or a script execution.

There are different profile scripts, in different locations, for the current user and all users on the system. PowerShell runs the profile scripts in the following order.

- All Users, All Hosts
- All Users, Current Host
- Current User, All Hosts
- Current user, Current Host

No profiles in remote sessions

[about Profiles - PowerShell | Microsoft Learn](#)

In PowerShell, the profile script is used to customize the shell environment and define functions, aliases, and variables. The profile is a PowerShell script file that's executed when you start a PowerShell session, whether it's an interactive session or a script execution.

Order of precedence

There are different profile scripts, in different locations, that apply to all users on the system or just the current user. PowerShell runs the profile scripts in the following order.

- All Users, All Hosts
- All Users, Current Host
- Current User, All Hosts
- Current user, Current Host

Any settings in the profile scripts are applied in the order they are run. The last setting applied overrides any previous settings.

The different profile scopes and locations allow you to create scripts that can be shared across your enterprise. You can deploy scripts using group policy or configuration management tools so that you can have a consistent PowerShell environment across all your systems.

File locations

Use the following command to see the list of profiles scripts and locations.

```
$profile | Select-Object *
```

On Windows:

```
AllUsersAllHosts      : C:\Program Files\PowerShell\7-preview\profile.ps1
AllUsersCurrentHost   : C:\Program Files\PowerShell\7-
preview\Microsoft.PowerShell_profile.ps1
CurrentUserAllHosts    : C:\Users\sewhee\Documents\PowerShell\profile.ps1
CurrentUserCurrentHost :
C:\Users\sewhee\Documents\PowerShell\Microsoft.PowerShell_profile.ps1
Length                 : 69
```

On Linux:

```
AllUsersAllHosts      : /opt/microsoft/powershell/7/profile.ps1
AllUsersCurrentHost   :
/opt/microsoft/powershell/7/Microsoft.PowerShell_profile.ps1
CurrentUserAllHosts    : /home/sdwheeler/.config/powershell/profile.ps1
CurrentUserCurrentHost :
/home/sdwheeler/.config/powershell/Microsoft.PowerShell_profile.ps1
Length                 : 67
```

PowerShell doesn't load profiles from remote sessions. If you are in a remote interactive session you can dot-source the profile script to load it.

```
. $profile
```

For more information, see [about_Profiles](#).

Version differences

Version differences

- [Differences between Windows PowerShell 5.1 and PowerShell 7.x](#)
- [about Special Characters](#)
- [about ANSI Terminals](#)

Feature	Windows PowerShell 5.1	PowerShell 7+
Special characters	[char]0x1b, [char]0xA9	`e, `u{A9}
ANSI coloring	Hand-crafted escape sequences	\$PSStyle
New cmdlets	No new cmdlets	Markdown cmdlets Get-Error Get-Uptime Remove-Alias Remove-Service
Removed cmdlets	Has WMI cmdlets Has Workflow cmdlets	Use CimCmdlets module instead No support for workflows
Changed cmdlets	Type information for CSV cmdlets Web cmdlets	Test-Connection Invoke-RestMethod Invoke-WebRequest ForEach-Object -Parallel
Experimental features	No experimental features	Disable-ExperimentalFeature Enable-ExperimentalFeature Get-ExperimentalFeature
New operators	No new operators	null, ternary, and chain operators
Encoding defaults	ASCII	UTF8

Differences between PowerShell 7 and Windows PowerShell 5.1

- PowerShell 7 has new character codes for Escape and any Unicode character
- PowerShell 7 has enhanced support for ANSI escape sequence handling in the console
- PowerShell 7 has several new cmdlets that aren't available in Windows PowerShell 5.1
 - [ConvertFrom-Markdown](#), [Show-Markdown](#)
 - [Get-Error](#)
 - [Get-Uptime](#)
 - [Remove-Alias](#)
 - [Remove-Service](#)
- PowerShell 7 is missing several cmdlets that are available in Windows PowerShell 5.1
 - WMI cmdlets (Use the CimCmdlets instead)
 - [Get-WmiObject](#)
 - [Invoke-WmiMethod](#)
 - [Register-WmiEvent](#)
 - [Remove-WmiObject](#)
 - [Set-WmiInstance](#)
 - The Workflow cmdlets
 - [Invoke-AsWorkflow](#)
 - [New-PSWorkflowSession](#)
 - [New-PSWorkflowExecutionOption](#)

- The behavior of some cmdlets has changed in PowerShell 7

For example, the `Invoke-RestMethod` cmdlet has 4 parameter sets and 58 parameters in PowerShell 7.

```
PS> $PSVersionTable.PSVersion.ToString()
7.4.5
PS> (Get-Command Invoke-RestMethod).ParameterSets.Count
4
PS> (Get-Command Invoke-RestMethod).Parameters.Count
58
```

The same command in Windows PowerShell has 1 parameter set and 34 parameters.

```
PS> $PSVersionTable.PSVersion.ToString()
5.1.22621.1778
PS> (Get-Command Invoke-RestMethod).ParameterSets.Count
1
PS> (Get-Command Invoke-RestMethod).Parameters.Count
34
```

- PowerShell 7 has new experimental features

```
PS> Get-ExperimentalFeature
```

Name	Enabled	Source	Description
PSCommandNotFoundSuggestion	True	PSEngine	Recommend potential commands based on fuzzy search on a CommandNotFound
PSCommandWithArgs	False	PSEngine	Enable `-CommandWithArgs` parameter for pwsh
PSFeedbackProvider	True	PSEngine	Replace the hard-coded suggestion framework with the extensible feed...
PSLoadAssemblyFromNativeCode	False	PSEngine	Expose an API to allow assembly loading from native code
PSModuleAutoLoadSkipOfflineFiles	True	PSEngine	Module discovery will skip over files that are marked by cloud provi...
PSSubsystemPluginModel	True	PSEngine	A plugin model for registering and un-registering PowerShell subsyst...

- PowerShell 7 has new operators that aren't available in Windows PowerShell 5.1

```
# Chain operators

# Stop the notepad process if it's running
Get-Process notepad && Stop-Process -Name notepad
```

```
# Start notepad if it's not running
Get-Process notepad || notepad

# Ternary operator ? <if-true> : <if-false>
(Test-Path $PROFILE) ? "Path exists" : "Path not found"
(Test-Path $PROFILE.AllUsersAllHosts) ? "Path exists" : "Path not found"

# Null coalescing operator ?? <if-null>
# Return the right side value if the left side is null

PS> $startDate = $null
PS> $startDate ?? (Get-Date).ToString("d")
8/30/2023
PS> $startDate = '1/10/2020'
PS> $startDate ?? (Get-Date).ToString("d")
1/10/2020
```

- PowerShell 7 has defaults to UTF-8 encoding for all output

Related articles

- [Differences between Windows PowerShell 5.1 and PowerShell 7.x](#)
 - [about Special Characters](#)
 - [about_ANSI_Terminals](#)
 - [Using Experimental Features in PowerShell](#)
 - [about_Operators](#)
 - [about_Character_Encoding](#)
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Platform differences

Feature	Windows	Non-Windows
Modules & cmdlets		No CimCmdlets module Many Windows-only cmdlets
Graphical elements	Out-GridView -ShowWindow parameter	Not available
Execution Policy	Requires configuration	Not used or supported No Authenticode
Case-sensitivity	Only in rare cases	Filesystem and environment variables
Aliases	Aliases that mimic Unix native commands	No aliases for native commands
Job Control	PowerShell jobs	PowerShell jobs only – no backgrounding
Path separators & line ending	Path = ';' Directory = '\' Line-ending = <CRLF>	Path = ':' Directory = '/' Line-ending = <LF>
Environment variables	Machine and User scopes Persisted in registry	Only one scope Must add to profile script

Platform differences

- [Release history of modules and cmdlets](#)
- [PowerShell differences on non-Windows platforms](#)

Differences between PowerShell 7 on Windows and non-Windows platforms

- PowerShell on Windows has several modules that aren't available on non-Windows platforms

The following modules are only available on Windows:

- CimCmdlets
- ISE (Windows PowerShell 5.1 only)
- Microsoft.PowerShell.Diagnostics
- Microsoft.PowerShell.LocalAccounts (Windows PowerShell 5.1 only)
- Microsoft.PowerShell.ODataUtils (Windows PowerShell 5.1 only)
- Microsoft.PowerShell.Operation.Validation (Windows PowerShell 5.1 only)
- Microsoft.WsMan.Management
- PSDiagnostics
- PSScheduledJob
- PSWorkflow (Windows PowerShell 5.1 only)
- PSWorkflowUtility (Windows PowerShell 5.1 only)

- Non-Windows platforms don't support graphical features like `Out-GridView` and `Get-Help -ShowWindow`
- Non-Windows platforms don't support Authenticode or the PowerShell execution policy
- Non-Windows platforms are case-sensitive

PowerShell is case-insensitive but case-preserving on all platforms. Non-Windows platforms are case-sensitive. For example, environment variables are case-sensitive on Linux.

```
PS> lsb_release -a
No LSB modules are available.
Distributor ID: Ubuntu
Description:    Ubuntu 22.04.2 LTS
Release:        22.04
Codename:       jammy

PS> Test-Path env:path
False

PS> Test-Path env:PATH
True
```

- PowerShell on Windows has several aliases that mimic native commands on non-Windows platforms

```
Get-Command cat, clear, cp, diff, kill, ls, man, mount, mv, ps, rm, rmdir,
sleep, sort, tee, write
```

Windows:

CommandType	Name	Version	Source
-----	----	-----	-----
Alias	cat -> Get-Content		
Alias	clear -> Clear-Host		
Alias	cp -> Copy-Item		
Alias	diff -> Compare-Object		
Alias	kill -> Stop-Process		
Alias	ls -> Get-ChildItem		
Alias	man -> help		
Alias	mount -> New-PSDrive		
Alias	mv -> Move-Item		
Alias	ps -> Get-Process		
Alias	rm -> Remove-Item		
Alias	rmdir -> Remove-Item		
Alias	sleep -> Start-Sleep		
Alias	sort -> Sort-Object		
Alias	tee -> Tee-Object		
Alias	write -> Write-Output		

Linux:

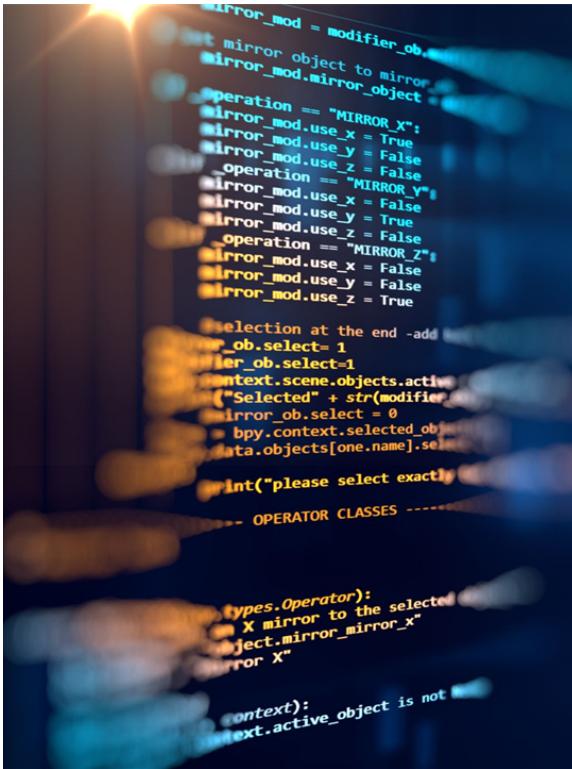
CommandType	Name	Version	Source
Application	cat	0.0.0.0	/usr/bin/cat
Application	clear	0.0.0.0	/usr/bin/clear
Application	cp	0.0.0.0	/usr/bin/cp
Application	diff	0.0.0.0	/usr/bin/diff
Application	kill	0.0.0.0	/usr/bin/kill
Application	ls	0.0.0.0	/usr/bin/ls
Application	man	0.0.0.0	/usr/bin/man
Application	mount	0.0.0.0	/usr/bin/mount
Application	mv	0.0.0.0	/usr/bin/mv
Application	ps	0.0.0.0	/usr/bin/ps
Application	rm	0.0.0.0	/usr/bin/rm
Application	rmdir	0.0.0.0	/usr/bin/rmdir
Application	sleep	0.0.0.0	/usr/bin/sleep
Application	sort	0.0.0.0	/usr/bin/sort
Application	tee	0.0.0.0	/usr/bin/tee
Application	write	0.0.0.0	/usr/bin/write

- PowerShell doesn't support Linux-style background jobs
- PATH, directory separator, and line-ending characters are different
 - Use `[System.IO.Path]` class to handle path separators
 - Use `[System.Environment]::NewLine` to handle line-ending characters

Related articles

- [Release history of modules and cmdlets](#)
- [PowerShell differences on non-Windows platforms](#)
- [Path Class \(System.IO\)](#)
- [Environment.NewLine Property](#)

Host differences



Host differences

- VS Code is not the same as ConsoleHost or ISE
 - What does Azure Data Studio show?
- Don't use `$Host.Version` when you want `$PSVersionTable.PSVersion`
- `$Host` can't be replaced

- VS Code isn't the same as ConsoleHost or ISE

Some features may not work the same. For example, the ISE doesn't support `Write-Progress`.

- Don't use `$Host.Version` when you want `$PSVersionTable.PSVersion`

Notice the version of the Host in the PowerShell Extension terminal of VS Code.

```
"$(($Host.Name) version = $($Host.Version))"  
"PowerShell version = $($PSVersionTable.PSVersion)"
```

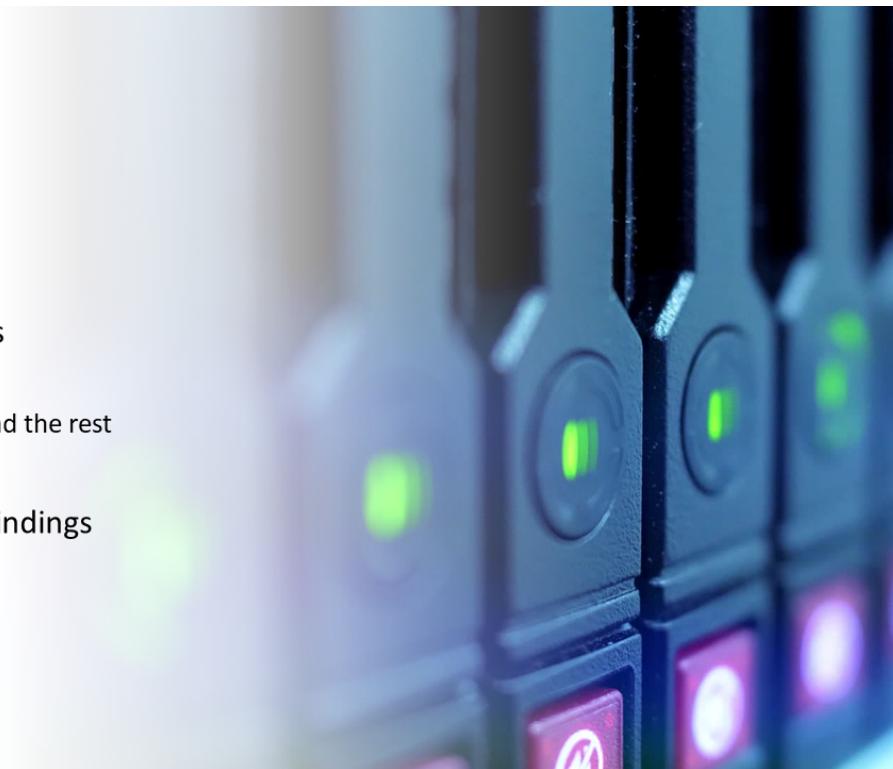
```
Visual Studio Code Host version = 2024.3.2  
PowerShell version = 7.4.5
```

- The `$Host` variable can't be replaced, so you can't use it in your scripts except to get Host information.

Setting up your environment

Setting up your environment

- Tool and application settings
- Loading modules
 - Only the most used – autoload the rest
- Adding helper functions
- Configuring colors and keybindings
- \$PSDefaultParameterValues
- Custom prompts



- Tool and application settings

Your profile script is where you configure your environment. Use it to set configuration options that don't persist across sessions.

- Loading modules

Load the modules you use the most. Let PowerShell command discovery autoload other modules on demand.

- Adding helper functions

Don't define a bunch of utility functions in your profile script. Instead, create a module and put your functions there. Only define the functions needed to bootstrap your environment in your profile script.

- Configuring colors and keybindings

PowerShell 7.2 added a new automatic variable, `$PSStyle`, and changes to the PowerShell engine to support the output of ANSI-decorated text. For Windows PowerShell, you can use the **PSStyle** module to achieve similar results. Also, the **PSReadLine** allows you to configure colors for syntax highlighting on the command line.

PSReadLine also lets you customize keybindings. For example, you can map the keybinding for `<Enter>` to the `ValidateAndAcceptLine` function. This function prevents you from running a command with syntax errors.

Add these commands to your profile so they persist across sessions.

- Default parameter values

The `$PSDefaultParameterValues` preference variable allows you to set default parameter values for cmdlets. For example, you may want the `Install-Module` to always use the `SkipPublisherCheck` parameter.

Here are several examples:

```
$PSDefaultParameterValues = @{
    'Out-Default:OutVariable'          = 'LastResult' # Save output to
$LastResult
    'Out-File:Encoding'              = 'utf8'        # PS5.1 defaults to
ASCII
    'Export-Csv>NoTypeInformation'   = $true         # PS5.1 defaults to
\$false
    'ConvertTo-Csv>NoTypeInformation' = $true         # PS5.1 defaults to
\$false
    'Receive-Job:Keep'              = $true         # Prevents accidental
loss of output
    # 'Group-Object>NoElement'      = $true         # Minimize noise in
output
    'Install-Module:AllowClobber'    = $true         # Default behavior in
Install-PSResource
    'Install-Module:Force'          = $true         # Default behavior in
Install-PSResource
    'Install-Module:SkipPublisherCheck' = $true       # Default behavior in
Install-PSResource
    'Find-Module:Repository'        = 'PSGallery'   # Useful if you have
private test repos
    'Install-Module:Repository'     = 'PSGallery'   # Useful if you have
private test repos
    'Find-PSResource:Repository'   = 'PSGallery'   # Useful if you have
private test repos
    'Install-PSResource:Repository' = 'PSGallery'   # Useful if you have
private test repos
}
```

- Custom prompts

The prompt that PowerShell displays is created by the `prompt` function. You can write your own custom `prompt` function to display whatever you want.

Related articles

- [about_Prompts](#)
- [about_Parameters_Default_Values](#)
- [Set-PSReadLineOption](#)
- [PSStyle module](#)

Other tips

Other tips

- Sync your profile scripts using OneDrive or GitHub
 - Use symlinks to link runtime location to source location
 - Don't sync modules using OneDrive
- Use profile hierarchy to separate configuration items
- Move utility functions to a module
 - They load on demand, no need to include in profile
- Sync your profile scripts using a OneDrive folder or a GitHub repository.

You can use symlinks to link the runtime location to source location.

You can use a script to create the symlink.

```
# Creating the symbolic link to the profile
$newItemSplat = @{
    ItemType = 'SymbolicLink'
    Value = 'C:\Git\My-Repos\tools-by-sean\profile\scripts\CurrentUserAllHosts.ps1'
    Path = $PROFILE.CurrentUserAllHosts
}
New-Item @newItemSplat
```

However, be careful using OneDrive. OneDrive won't sync symlinks. Don't let OneDrive redirect your **Documents** folder on Windows. This causes problems with the command discovery and module loading.

- Use the profile hierarchy to separate configuration items.

Put the configurations that are most common in the **\$PROFILE.CurrentUserAllHosts** profile or higher. Put configurations that are specific to a host in the **\$PROFILE.CurrentUserCurrentHost**



profile.

- Move utility functions out of your profile and into a module.

The modules get loaded on demand. There is no need to include them in your profile.

- Don't pollute your environment with a bunch of variables in your profile.

- Wrap code in functions or script blocks to limit the scope of variables.
 - Use the `$global:` scope to create and manage the variables you want to be available everywhere.
-

Resources & links

Modules

- [PSStyle](#)
- [CompletionPredictor](#)
- [Microsoft.PowerShell.UnixTabCompletion](#)

Docs

- [about_Profiles](#)
- [Differences between Windows PowerShell 5.1 and PowerShell 7.x](#)
- [about_Special_Characters](#)
- [about_ANSI_Terminals](#)
- [Release history of modules and cmdlets](#)
- [PowerShell differences on non-Windows platforms](#)
- [about_Operators](#)

Demo scripts

- [demo.ps1](#) - Script used to demonstrate the version and platform differences in PowerShell
- [Microsoft.PowerShell_profile.ps1](#) - Sample profile script showing how to manage the version and platform differences
- [Microsoft.VSCode_profile.ps1](#) - Sample profile script that gets run by the PowerShell extension for VS Code