Introduction

A variable in PowerShell is a container that is assigned a value. holds. Think of them as named boxes where you can place information to use later. The value of a variable can be accessed simply by referencing the variable, and it can be changed at any time by reassigning the variable with a new value. Variables are very handy for keeping track of data in scripts or during a PowerShell session.

PowerShell Variable Examples

Let's dive into some of the most useful ways to use variables in PowerShell.

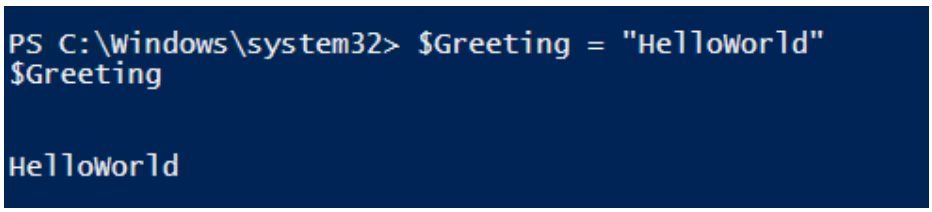
Create and Set Variables in PowerShell

Variable names in PowerShell begin with a dollar sign ($), and they are not case-sensitive, so, for instance **$VAR** and **$var** refer to the same variable. A variable name can contain letters, numbers and underscores. While they can contain spaces and other special characters, it is best to avoid those.

Once you have chosen a name for a variable in PowerShell, you can create it and assign it a value in one command. For example, if you want create a variable named **$Greeting** and assign it the string value *Hello, World*, you would use this command:

```
$Greeting = "Hello, World"
```

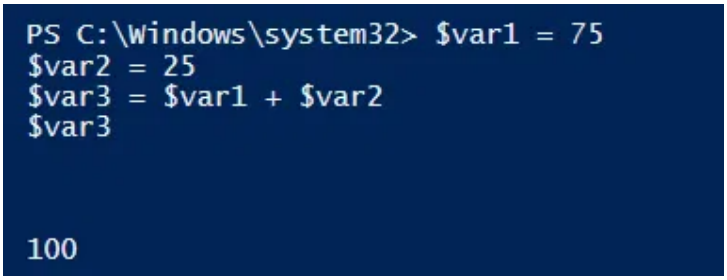
After this command, whenever you type **$Greeting**, PowerShell will substitute the value you assigned to that variable, as shown below.



The double quotes (“ ”) in the previous example indicate that the value is a string. Here is how you can create a variable and assign it integer value:

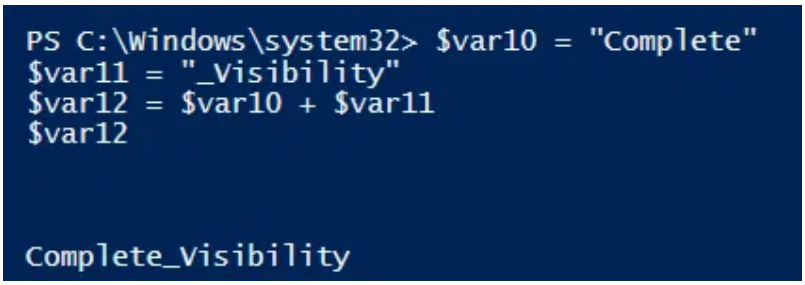
```
$var1 = 75

$var2 = 25
```

You can perform arithmetic operations with number variables, as shown here:



You can also combine strings using the plus-sign (**+**) operator:

```
$var10 = “Complete”

$var11 = “Visibility

$var12 = $var10 + $var11
```



If you add a number to a string, the number automatically becomes a string:

```
$var1 = “Netwrix”

$var2 = 2023
```

```
PS C:\Windows\system32> $var1 = "Netwrix"
$var2 = 2023
$var3 = $var1 + $var2
$var3

Netwrix2023
```

Set or Check a Variable's Type

Variables in PowerShell can store multiple data types, including strings, integers and more complex objects like arrays. When you assign a value to a variable, PowerShell automatically determines the data type based on the value. This is known as dynamic typing. As noted above, strings require quotes.

Here are some examples:

```
$var1 = "Hello"   # The type of $var1 is String

$var2 = 25        # The type of $var2 is Integer

$var3 = Get-Date # The type of $var3 is DateTime
```

To find out what type a variable is, we use the **GetType** parameter:

```
$var5 = “Netwrix”
$var5.GetType () .FullName
```

```
PS C:\Windows\system32> $var1 = "Netwrix"
$var1.GetType().FullName
System.String
```

The most common variable types include the following:

- **String**: Text (you can declare a string by enclosing text within quotation marks)
- **Integer**: A whole number
- **Double**: A number that includes a decimal point
- **Boolean**: A truth value, either $True or $False
- **DateTime**: A date and time
- **Array**: A data structure that holds a collection of items of the same or different types. The items are stored sequentially and can be accessed by an index. Here is an example of how to declare an array:

```
$myArray = "apple", "orange", "cherry"
```

- **HashTable**: A data structure that comprises an unordered collection of key-value pairs. It's like a dictionary where you use a unique key to store and retrieve each value. This makes hashtables excellent for lookups and scenarios where you need to easily search for values. To create a hashtable, you use **@{}**. Inside the curly brackets, you specify each pair as the key followed by an equal sign (=) and then the value, as illustrated in this example:

```
$myHashtable = @{

    "Fruit1" = "Apple"

    "Fruit2" = "Orange"

    "Fruit3" = "Cherry"

}
```

Define a Variable's Scope

Scope is the visibility and accessibility of a variable. PowerShell has several different scopes:

- **Local** — The current scope
- **Global** —The scope that's in effect when PowerShell starts or when you create a new session or runspace
- **Script** — The scope that's created while a script runs

Variables are specified in PowerShell as follows:

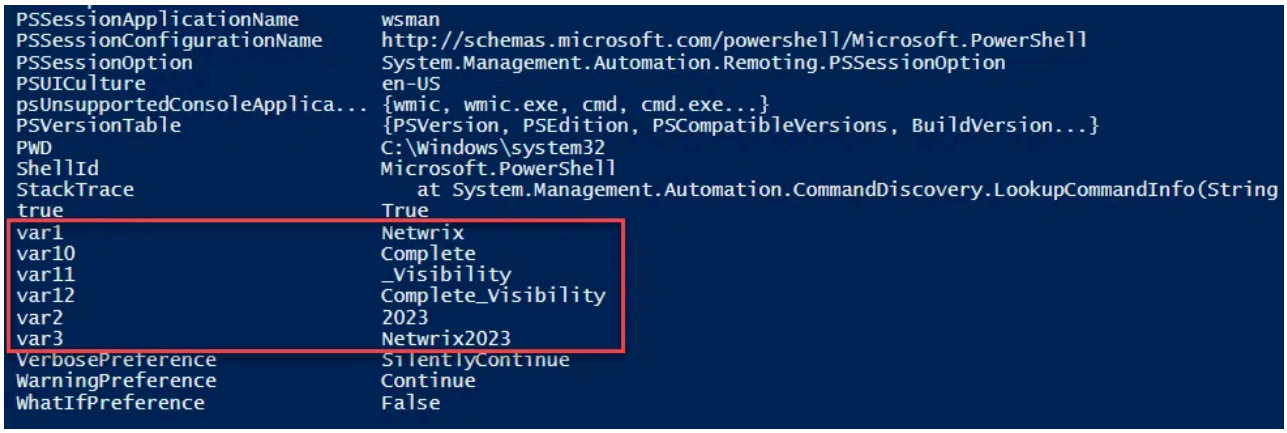
```
$global:Var1 = "Global Variable"

$script:Var2 = "Script Variable"

$local:Var3 = "Local Variable"
```

Public vs. Private Variables

The **Visibility** property of a variable is related to scope; it determines whether you can see the item outside the script in which it was created. The **Visibility** property can have a value of **Public** or **Private**. Private variables can be viewed and changed only in the scope in which they're created. Public variables are accessible from any scope.

List (Get) Variables in Current Scope

You can list all current variables in a PowerShell session by using the **Get-Variable** cmdlet, which retrieves all variables in the current scope. The example below lists some of the variables used in earlier examples.



Print a Variable

You can output a variable a .txt, .csv or HTML file.

To write to a .txt file, use the **Out-File** command:

```
$var5 = “Hello World”

$var5 | Out-File c:scriptsHello_World.txt
```

To export data to a .csv file, use the **Export-Csv** command:

```
$var6 = Get-Process

$var6 | SELECT Name, Path | Export-Csv -Path c:scriptsprocesses.csv
```

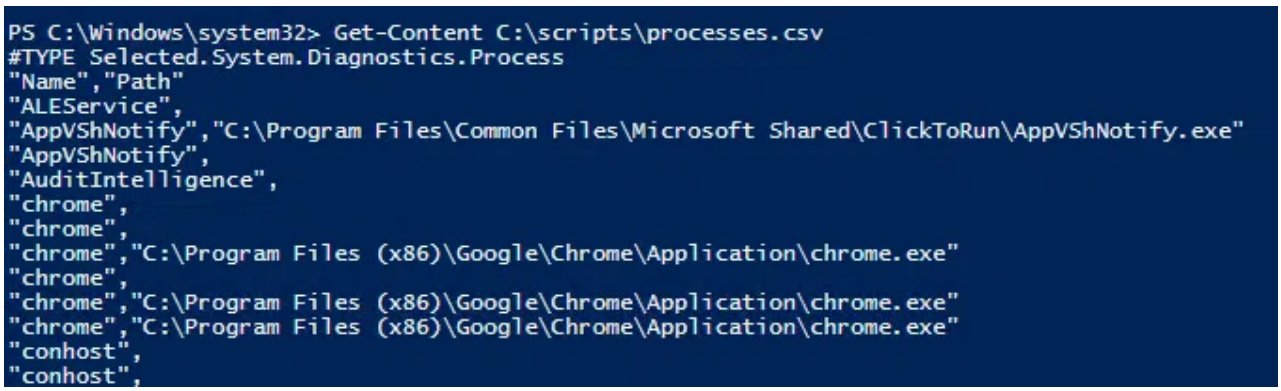
#TYPE Selected.System.Diagnostics.Process	
Name	Path
ALEService	
AppVShNotify	C:\Program Files\Common Files\Microsoft Shared\ClickToRun\AppVShNotify.exe
AppVShNotify	
AuditIntelligence	
chrome	
chrome	
chrome	C:\Program Files (x86)\Google\Chrome\Application\chrome.exe
chrome	
chrome	C:\Program Files (x86)\Google\Chrome\Application\chrome.exe
chrome	C:\Program Files (x86)\Google\Chrome\Application\chrome.exe
conhost	
conhost	
csrss	

And to write to an HTML file, use the **ConvertTo-Html** command:

```
$var6 = Get-Process

$var6 | ConvertTo-HTML -Property Name, Path>C:scriptprocesses.html
```

To read a file that you exported, use the **Get-Content** cmdlet:

```
Get-Content c:\scripts\processes.csv
```



Clear a Variable

The **Clear-Variabl**e cmdlet is used to remove the value from a variable but leaves the variable object itself. When a variable is cleared, the variable still exists, but its value is **$null**. In the example below, a variable is created and then cleared, with each action confirmed.

```
PS C:\Windows\system32> # Create a variable
$myVar = "Hello, World!"

# Check the variable's value
$myVar  # Outputs: Hello, World!

# Clear the variable
Clear-Variable -Name myVar

# Check the variable's value again
$myVar  # Outputs nothing because the variable's value is now $null
```

Remove a Variable

The **Remove-Variable** cmdlet is used to delete a variable and its value.

In the example below, a variable called **Example** is created and assigned the string "Hello World!". The variable is then deleted by the **Remove-Variable** cmdlet. Then the script checks the variable and returns an error because it no longer exists.

```
PS C:\Windows\system32> # Create a variable
$Example = "Hello, World!"

# Check the variable
$Example
# Output: Hello, World!

# Remove the variable
Remove-Variable Example

# Check the variable again
$testVar
# Output: Error - variable cannot be found
```

Note that the **Remove-Variable** cmdlet removes only the variable in the current scope. If there is a variable with the same name in a parent scope, that variable will not be affected. Similarly, **Remove-Variable** does not affect any child scopes that might contain a variable with the same name.

The difference between the **Clear-Variable** and the **Remove-Variable** commands is that clearing the variable deletes only the value of the variable, while removing it deletes the variable itself.

Parameters

The cmdlets discussed above take various parameters. Let's review the most useful parameters and how they function.

Description

PowerShell variables have a Description property that you can set using the **Set-Variable** cmdlet with the **Description** parameter:

```
Set-Variable -Name "myVariable" -Description "This is my sample variable"
```

Exclude

To exclude certain variables when you are using the **Get-Variable** cmdlet, use the **Exclude** parameter and specify the names variables to exclude. In the example below, we create 4 variables. We then used the **Get-Variable -Exclude** command to exclude two of them.

```
$Var1 = "Test1"

$Var2 = "Test2"

$Var3 = "Test3"

$OtherVar = "Other"

Get-Variable -Exclude Var1, OtherVar
```

(To include only specific variables, use the **Name** parameter as described below.)

Force

You can use the **Force** parameter with some commands, such as **Set-Variable** and **Remove-Variable**, to override any restrictions that might prevent the command from completing.

For example, normally any attempt to change the value of a read-only variable will result in an error, as shown below:

```
PS C:\Windows\system32> # Create a read-only variable
Set-Variable -Name "myVar" -Value "Initial Value" -Option ReadOnly

# Try to change the value
Set-Variable -Name "myVar" -Value "New Value" # This will cause an error


Set-Variable : Cannot overwrite variable myVar because it is read-only or constant.
At line:5 char:1
+ Set-Variable -Name "myVar" -Value "New Value" # This will cause an er ...
+ ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
    + CategoryInfo          : WriteError: (myVar:String) [Set-Variable], SessionStateUnauthorizedAccessException
    + FullyQualifiedErrorId : VariableNotWritable,Microsoft.PowerShell.Commands.SetVariableCommand
```

However, you can override this behavior with the **Force** parameter:

```
PS C:\Windows\system32> # Create a read-only variable
Set-Variable -Name "myVar" -Value "Initial Value" -Option ReadOnly

# Force the change
Set-Variable -Name "myVar" -Value "New Value" -Force # This will succeed


PS C:\Windows\system32>
```

Name

You can use the **Name** parameter to refer to a variable by its name without the dollar sign. In particular, you can use it to get only variables whose names match a certain pattern. For instance, using the cmdlet below, you can retrieve only variables whose names start with “Net”:

```
Get-Variable -Name "NET*"
```

The asterisk (*) is a wildcard character that stands for any number of additional characters.

Option

You can specify the **Option** parameter with the **Set-Variable** cmdlet. Available values for this parameter include:

- **None** (default): The variable behaves as a normal variable.
- **ReadOnly**: The variable cannot be changed or deleted.
- **Constant**: The variable cannot be changed or deleted, even with the **Force** parameter.
- **Private**: The variable is available only in the current scope.
- **AllScope**: The variable is copied to any new scopes that are created.

An example of the **ReadOnly** option is shown here:

```
PS C:\Windows\system32> # Create a read-only variable
Set-Variable -Name "example3" -Value "Netwrix" -Option ReadOnly
```

PassThru

By default, most cmdlets that perform an action (like **Set-Variable**, **New-Item** and **Remove-Item**) don’t output anything; they just silently complete the action. However, if you use the **PassThru** parameter, the cmdlet will output an object that represents the item that you manipulated with the cmdlet.

Here is an example of using **PassThru** with **Set-Variable**:

```
PS C:\Windows\system32> Set-Variable -Name "Example7" -Value "Hello, World!" -PassThru

Name                           Value
----                           -----
Example7                       Hello, World!
```

WhatIf

You can use the **WhatIf** parameter cmdlets that make changes, such as **Set-Variable**, **Remove-Variable** or **Clear-Variable**, to see what would happen if you were to run the cmdlet, without making any actual changes. This is useful if you're uncertain about what a cmdlet would do. An example is shown below:

```
PS C:\Windows\system32> Set-Variable -Name MyVariable -Value "Netwrix" -WhatIf
What if: Performing the operation "Set variable" on target "Name: MyVariable Value: Netwrix".
```

Conclusion

With a solid understanding of how PowerShell variables can be created and manipulated, you can create PowerShell scripts to assist you in task automation, system administration, software development and more.

How Netwrix Can Help

Need to secure your Active Directory and Entra ID (Azure AD) environment more efficiently and effectively? Consider Netwrix GroupID. Its automated group and user management capabilities reduce the risk of data breaches while eliminating time-wasting manual administrative tasks.

Netwrix GroupID empowers you to:

- Automate user provisioning and deprovisioningfromyour HR information system (HRIS) to Active Directory, Entra ID and SCIM-enabled applications, thereby enabling new employees to quickly be productive and slashing the risk of adversaries taking over stale identities.
- Automatically update directory groups based on changes like an employee's promotion or shift to another role, as recorded in your HRIS. This automation keeps access rights updated in near real time as required for security and compliance, while saving your IT team time.
- Delegate group and user management to the people who know who should have access to what. Simple workflows enable line-of-business owners to review their groups and approve or deny user access requests, reducing the risk of having over-privileged groups and users in your directory.