# PowerShell Standards Agency

Paul Broadwith
Craig Porteous

# About Us

## Craig Porteous

Data Engineer @ Incremental Group

Data Platform MVP

Worked in BI with the Microsoft stack for more than 10 years.

SQL Glasgow UG co-leader. SQLGLA Creator.

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## Paul Broadwith

Senior Technical Engineer @ Chocolatey Software

25 years in IT in the defence, government, financial services and nuclear industry sectors.

Scottish PowerShell & DevOps User Group Founder

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#PowerShellStandardsAgency

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There are

# NO

standards!

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# Aims

Introduce some tools

Outline techniques to develop your own standard

Look at some advanced language features

Talk about the importance of Community

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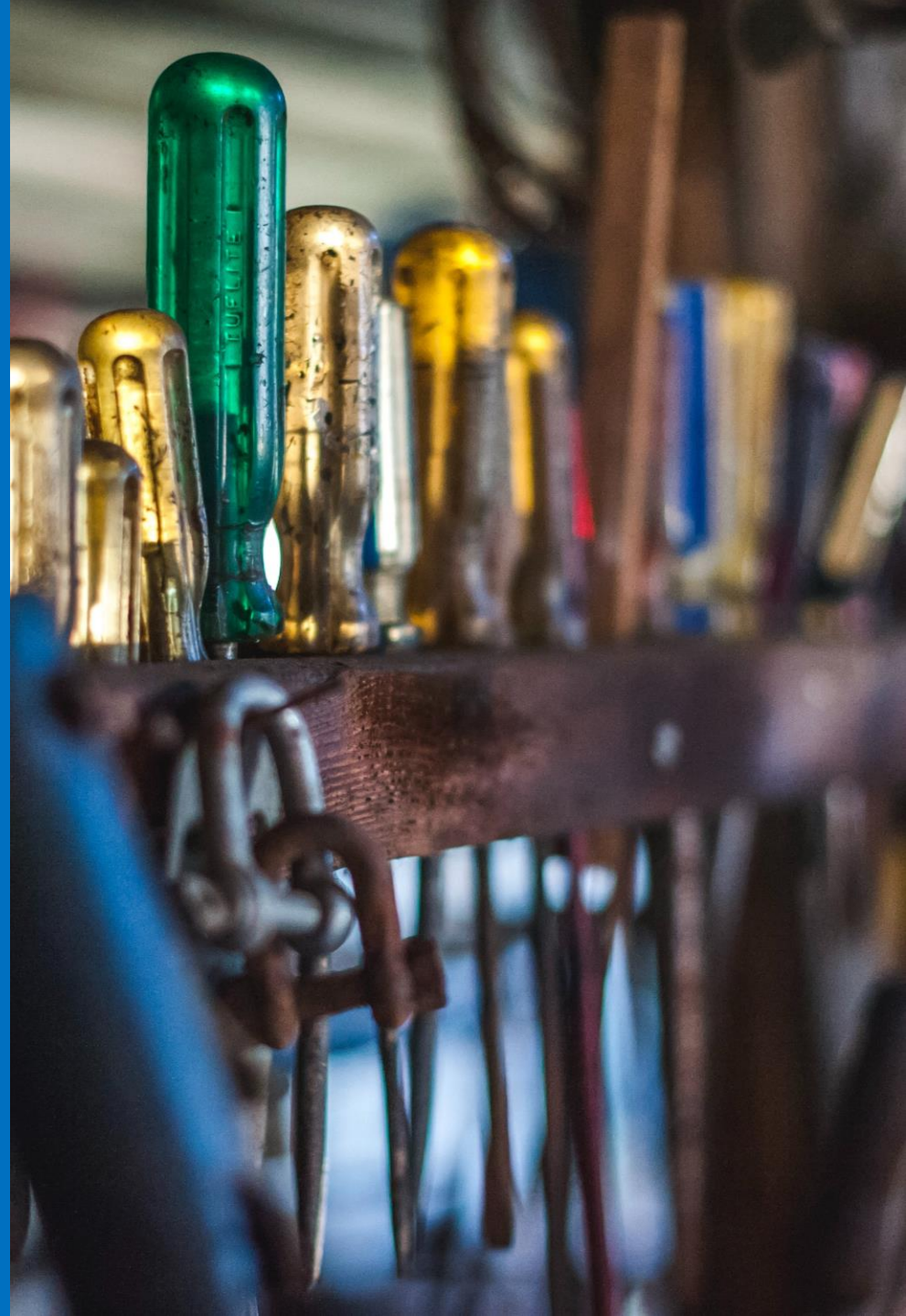
# Tools

- Visual Studio Code
- PSScriptAnalyzer
- Pester



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# Visual Studio Code

Replacement for PowerShell ISE

Cross-platform

Extensions for many different languages

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# PSScriptAnalyzer

*"PSScriptAnalyzer* ***checks the quality of*** *Windows PowerShell* ***code by running a set of rules****. The rules are* ***based on PowerShell best practices*** *identified by PowerShell Team and the community."*

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# Pester

## Tests your code

```
Executing all tests in '.'

Executing script C:\projects\pester_nohwnd\Examples\Planets\Get-Planet.Tests.ps1

  Describing Get-Planet
    [+] Given no parameters, it lists all 8 planets 39ms

    Context Filtering by Name
      [+] Given valid -Name 'Earth', it returns 'Earth' 27ms
      [+] Given valid -Name 'ne*', it returns 'Neptune' 16ms
      [+] Given valid -Name 'ur*', it returns 'Uranus' 17ms
      [+] Given valid -Name 'm*', it returns 'Mercury Mars' 15ms
      [+] Given invalid parameter -Name 'Alpha Centauri', it returns $null 17ms
Tests completed in 134ms
Tests Passed: 6, Failed: 0, Skipped: 0, Pending: 0, Inconclusive: 0
```

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# Code Review

```powershell
function Start_DeathStar {
    Param ([string]$param1)
if(!$param1){
Write-host "You didn't provide a parameter"; Return}
if ($param1 -eq "Alderaan")
{
    TurnON -param1 'Alderaan'
} else {
    turnOFF }
}

function TurnON{Param ()
    $true
}

function turnOFF{
    #this is False
    $false}
```

REJECTED

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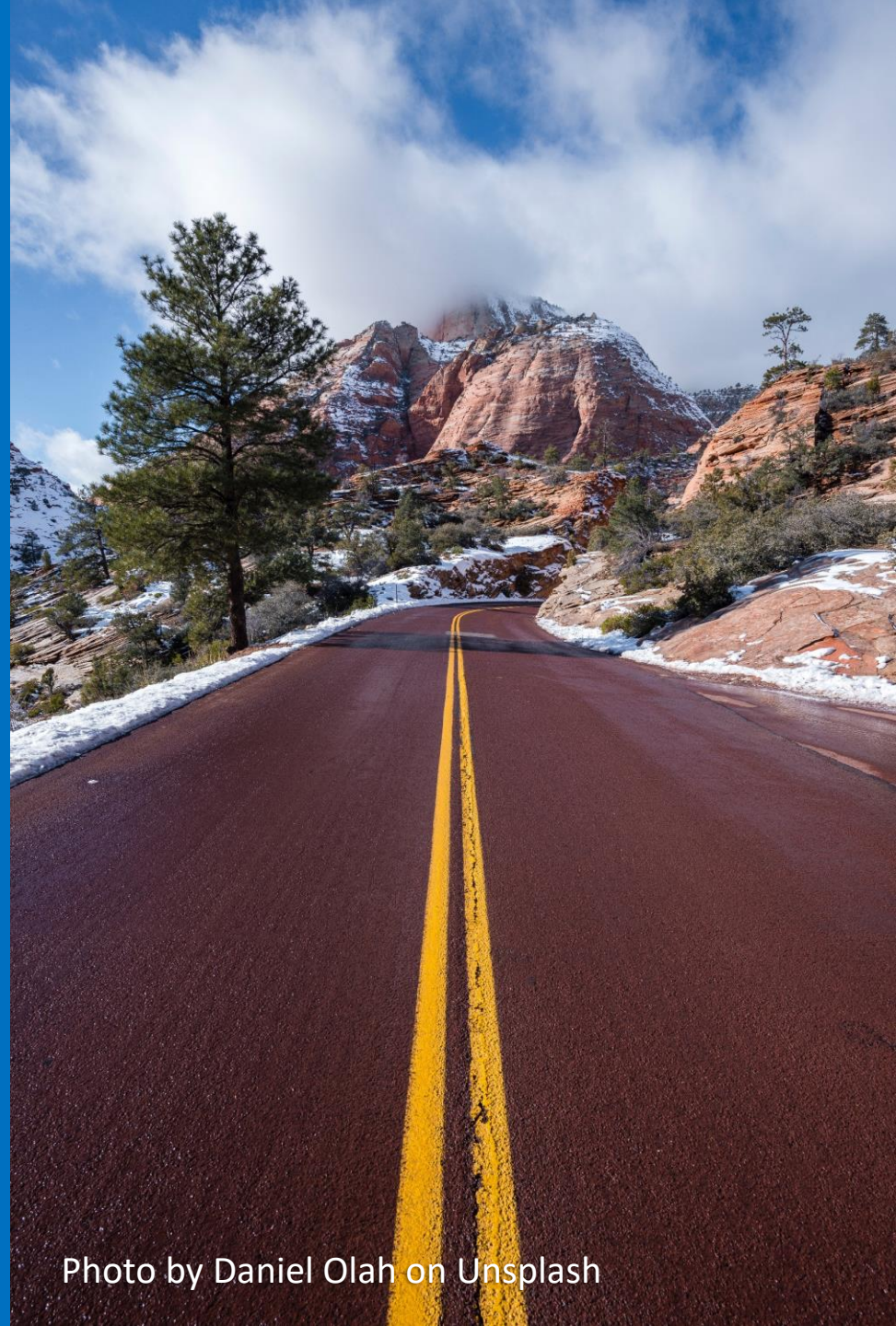
# The Road To Standards

## Consistency

### Readability



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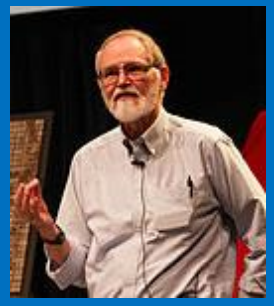
# Bracing Style

There are three commonly used types:

Allman (or BSD Indent Style)



Kernighan & Ritchie (OTBS)

Stroustrup

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# Bracing Style

DEMO 1

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# Auto formatting with Visual Studio Code

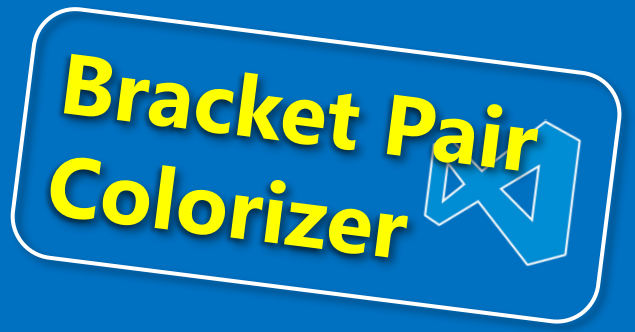
SHIFT + ALT + F

(Reformats your document to your chosen brace style)

To set your brace style:

Ctrl + ,

Search for 'powershell brace'



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# Bracing Style

# DEMO 2

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# Tabs vs Spaces

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Whichever style you choose

# BE CONSISTENT!

(and remember Pester!)

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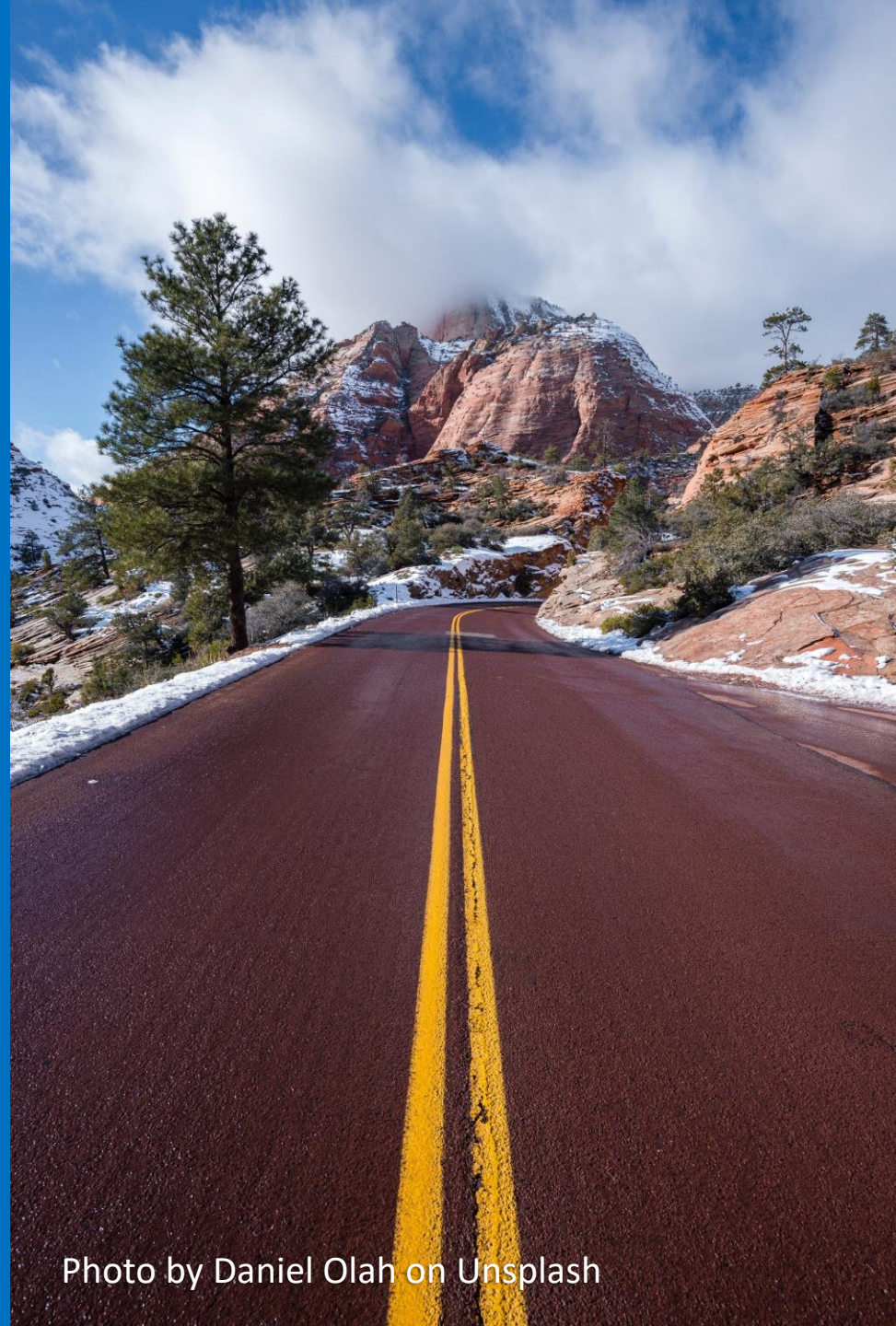
# The Road To Standards

## Consistency

- Readability
- Naming



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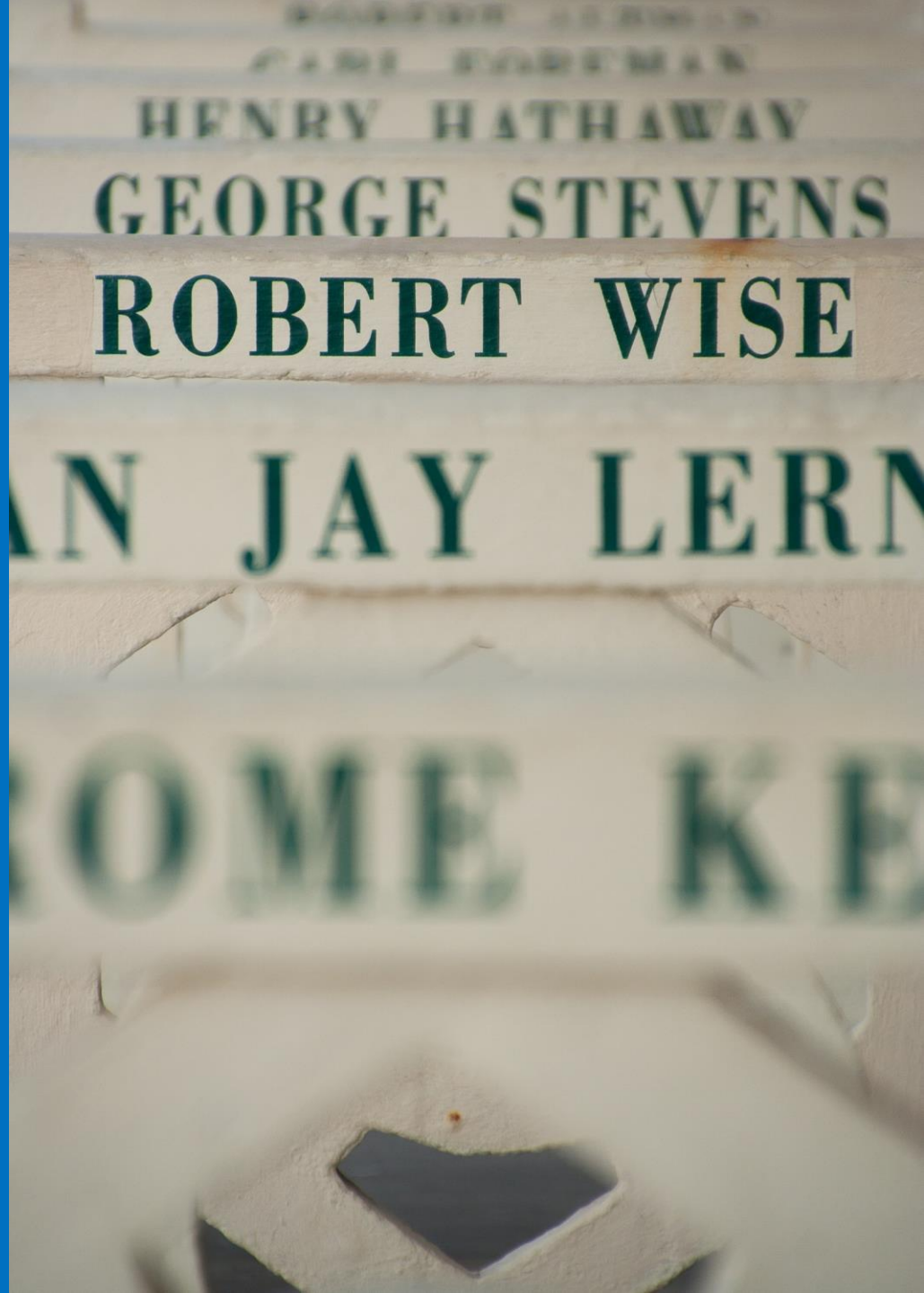
# Naming Style

- Variables
- Functions
- Parameters



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# Variables

Avoid Data Type Names

Describe its Use

Use camelCase

Bad Naming

```
$myVariable = 10

$stringName = 'Luke'

$whosTheDaddy = 'Darth Vader'

$zigazigahh = ' a song'
```

Good Naming

```
$totalFish = 10

$firstName = 'Luke'

$tieFighterPilot = 'Darth Vader'

$song = 'Wannabe'
```

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# Functions

Use Verb-Noun naming.

Use approved verbs – find them with **Get-Verb**.

PSScriptAnalyzer warns of unapproved verbs.

```
PS C:\> Get-Verb

Verb            Group
----            -----
Add             Common
Clear           Common
Close           Common
Copy            Common
Enter           Common
Exit            Common
Find            Common
Format          Common
Get             Common
Hide            Common
Join            Common
Lock            Common
Move            Common
New             Common
Open            Common
Optimize        Common
Pop             Common
```

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# Functions

## DEMO 3

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# Functions

Use Singular Nouns

Use PascalCase

## Bad Naming

```
function Get-Employees {}

function ListAllStaff {}

function start_death_star {}

function fireboomstick {}
```

## Good Naming

```
function Get-Employee {}

function Get-AllStaff {}

function Start-DeathStar {}

function Invoke-BoomStick {}
```

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# Functions

## Make them unique

| | |
|---|---|
|  dbatools | Verb-**Dba**Noun |
| Azure AD | Verb-**AzureAD**Noun |
| ReportingServicesTools | Verb-**RS**Noun |

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# Parameters

Use Singular Nouns

Use PascalCase

Bad Naming

```powershell
function Start-DeathStars {
    Param (
        [string[]]
        $Targets
    )
}
```

Good Naming

```powershell
function Start-DeathStar {
    Param (
        [string[]]
        $Target
    )
}
```

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# Parameters

`-Path`

`-ComputerName`

## Common parameter names

`-Name`

`-Force`

`-Credential`

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Whichever style you choose

# BE CONSISTENT!

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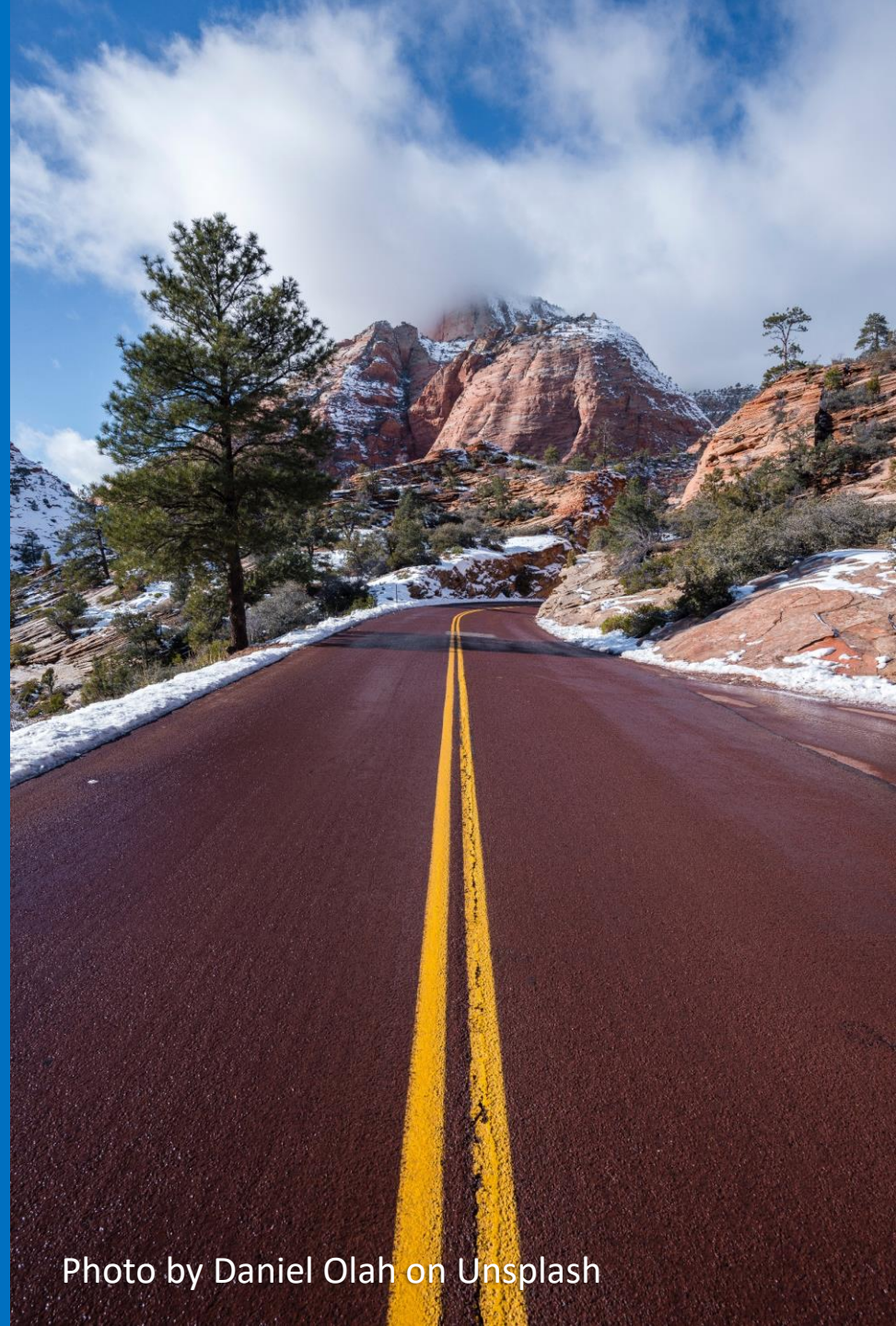
# The Road To Standards

## Consistency

- Readability
- Naming
- Comments



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# Commenting

Good code almost comments itself.

Delicate balance of help without obscuring the code.

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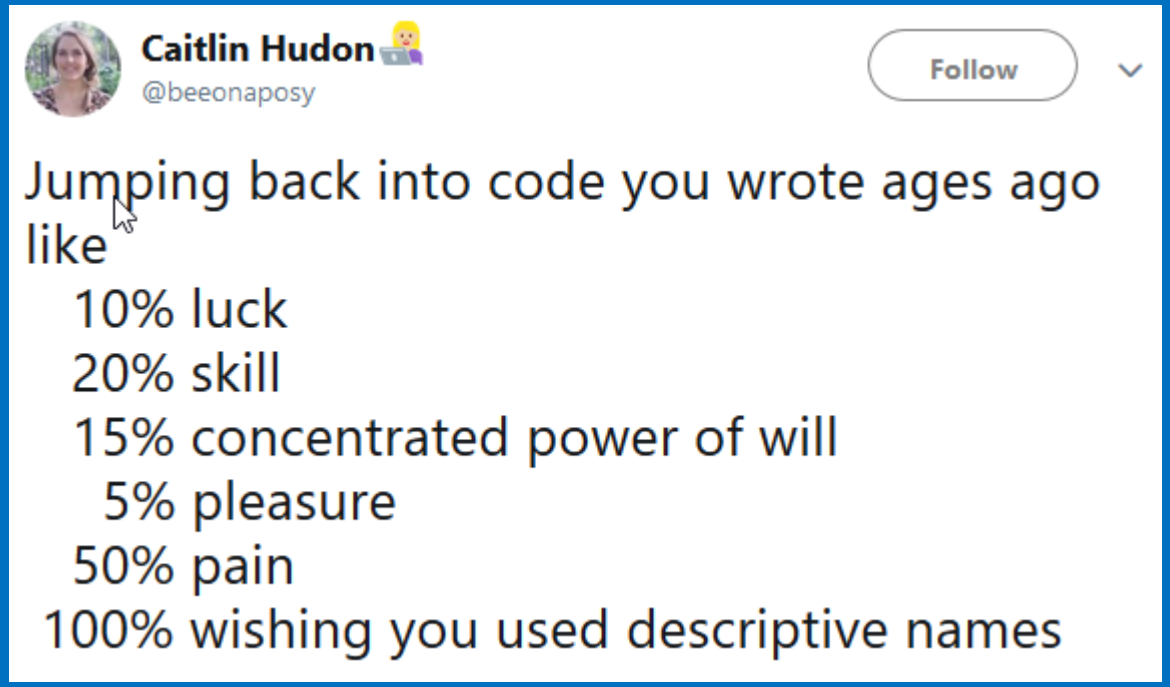
# Commenting




Avoid technical debt!

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# Commenting


Single Line Comment `# ...`

```
# A single line comment
```

Block Comment `<# ... #>`

```
<# Comments over a
    few lines.#>
```

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# Commenting

```powershell
# setting $myVar to 10
$myVar = 10
# Copying Notepad.exe from C:\Windows to C:\Temp
Copy-Item -Path "C:\Windows\Notepad.exe" -Destination "C:\Temp\"
```

```powershell
$fileList = Get-ChildItem "C:\Windows" |
    Where-Object { $_.PsIsContainer -eq $false } |
    Group-Object -property extension |
    Sort-Object -Property count -Descending |
    Select-Object -First 5
```



```powershell
# the number of extensions to get
$top = 10
Copy-Item -Path "C:\Windows\Notepad.exe" -Destination "C:\Temp\"

# Getting the top 5 file extensions used in the Windows folder
$topExtensions = Get-ChildItem "C:\Windows" |
    Where-Object { $_.PsIsContainer -eq $false } |
    Group-Object -property extension |
    Sort-Object -Property count -Descending |
    Select-Object -First $top
```

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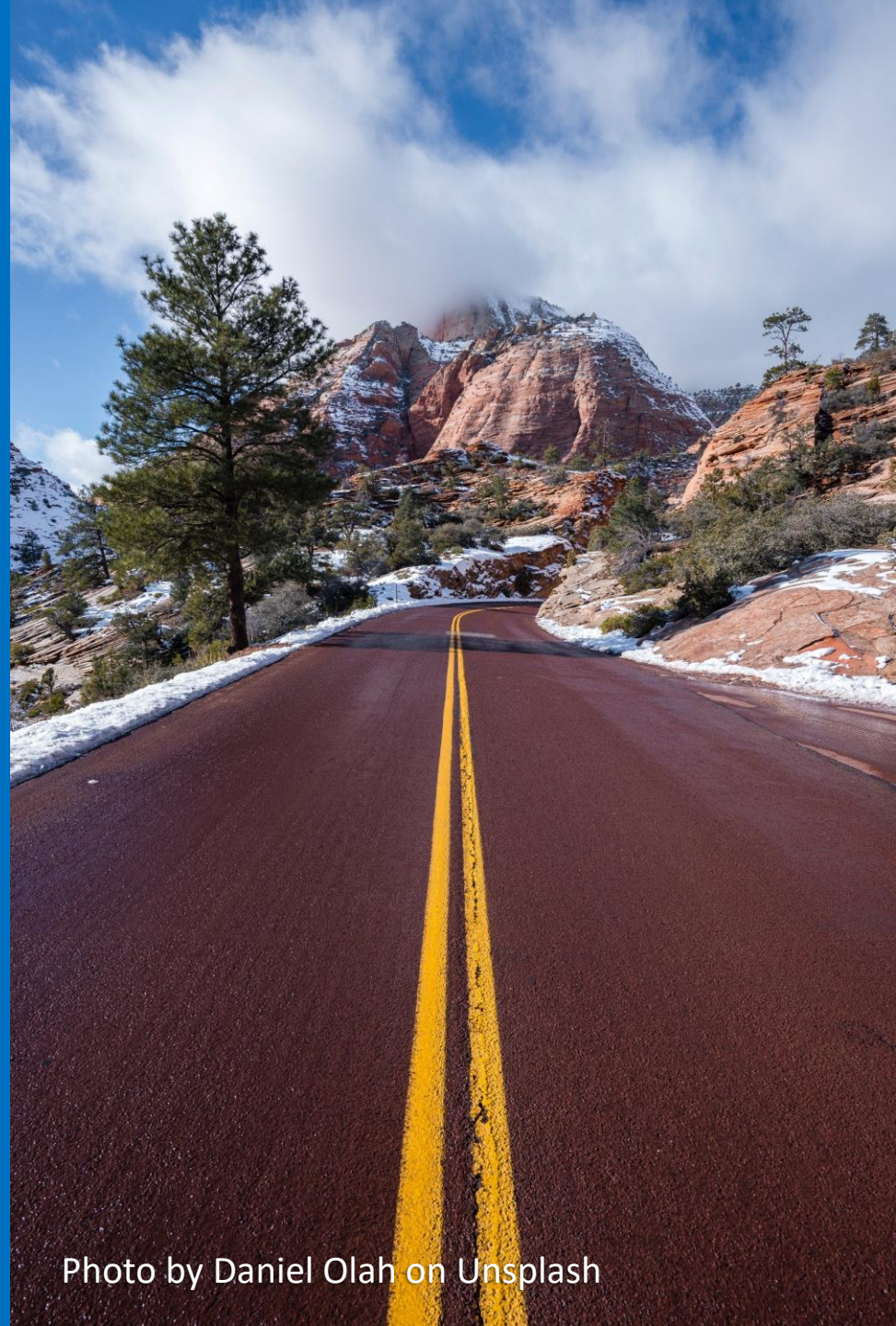
# The Road To Standards

## Consistency

- Readability
- Naming
- Comments
- Function Help



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# Comment based Help

# DEMO 4

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# Auto inserting help with Visual Studio Code

```
##
```

Before or after your function name to have VS Code automagically insert the comment based help.

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# Whichever way you add comments and help

# BE CONSISTENT!

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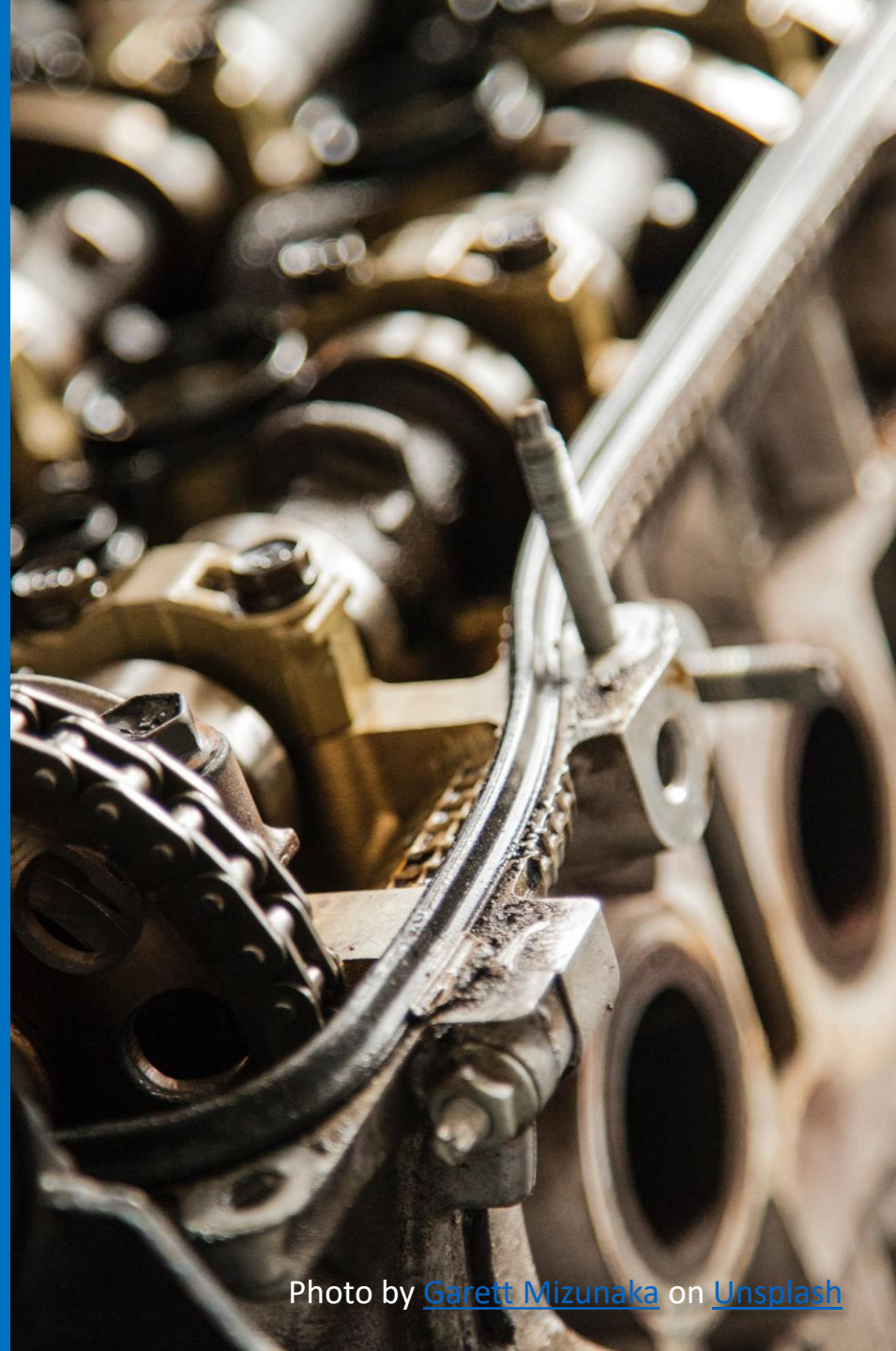
# Language Features

## Advanced Functions



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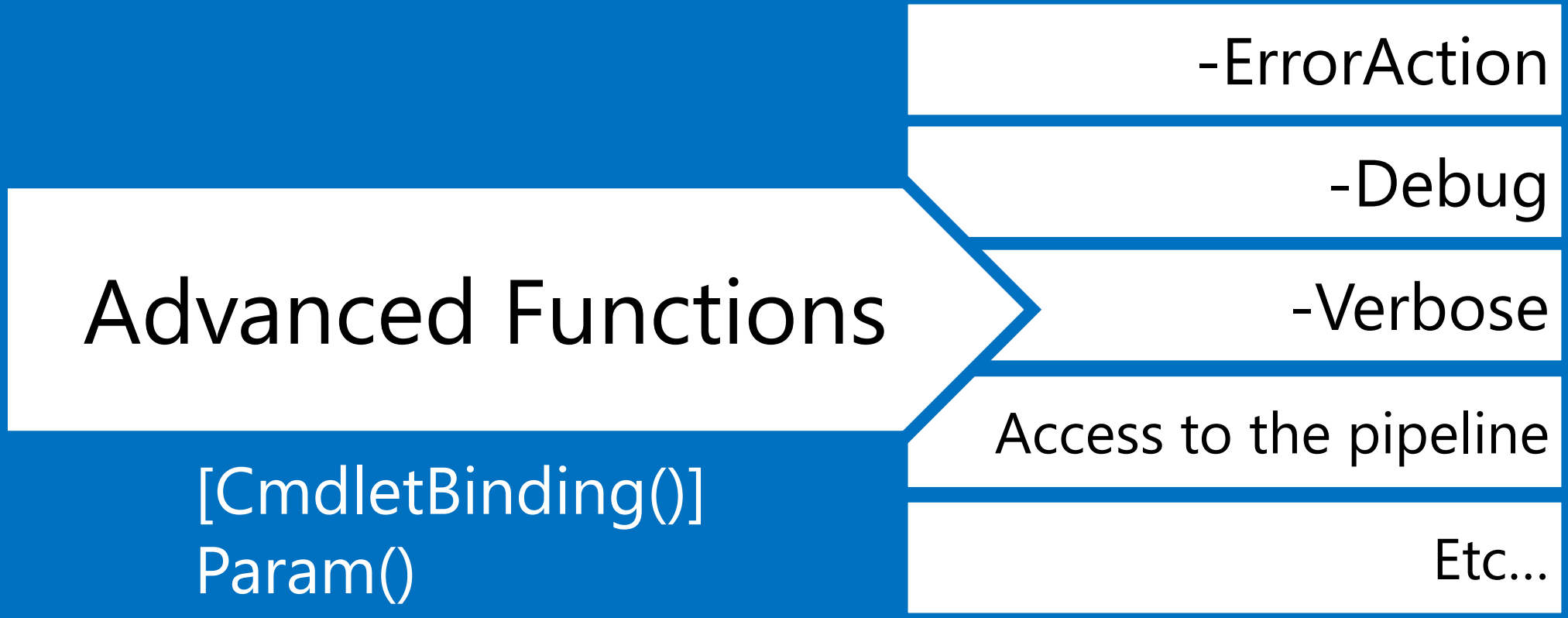
# Advanced Functions



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# Advanced Functions

## Use **Write-Verbose**

```powershell
function Set-Quota {
    [CmdletBinding()]
    Param (
        [int]$Quota
    )

    Write-Verbose "Setting file quota to '$Quota'."
    Set-FileQuota -FileQuota $Quota
}
```

## Add **–Verbose** to the call.

```
PS C:\> Set-Quota 10 -Verbose
VERBOSE: Setting file quota to '10'.
```

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# Advanced Functions

## DEMO 5

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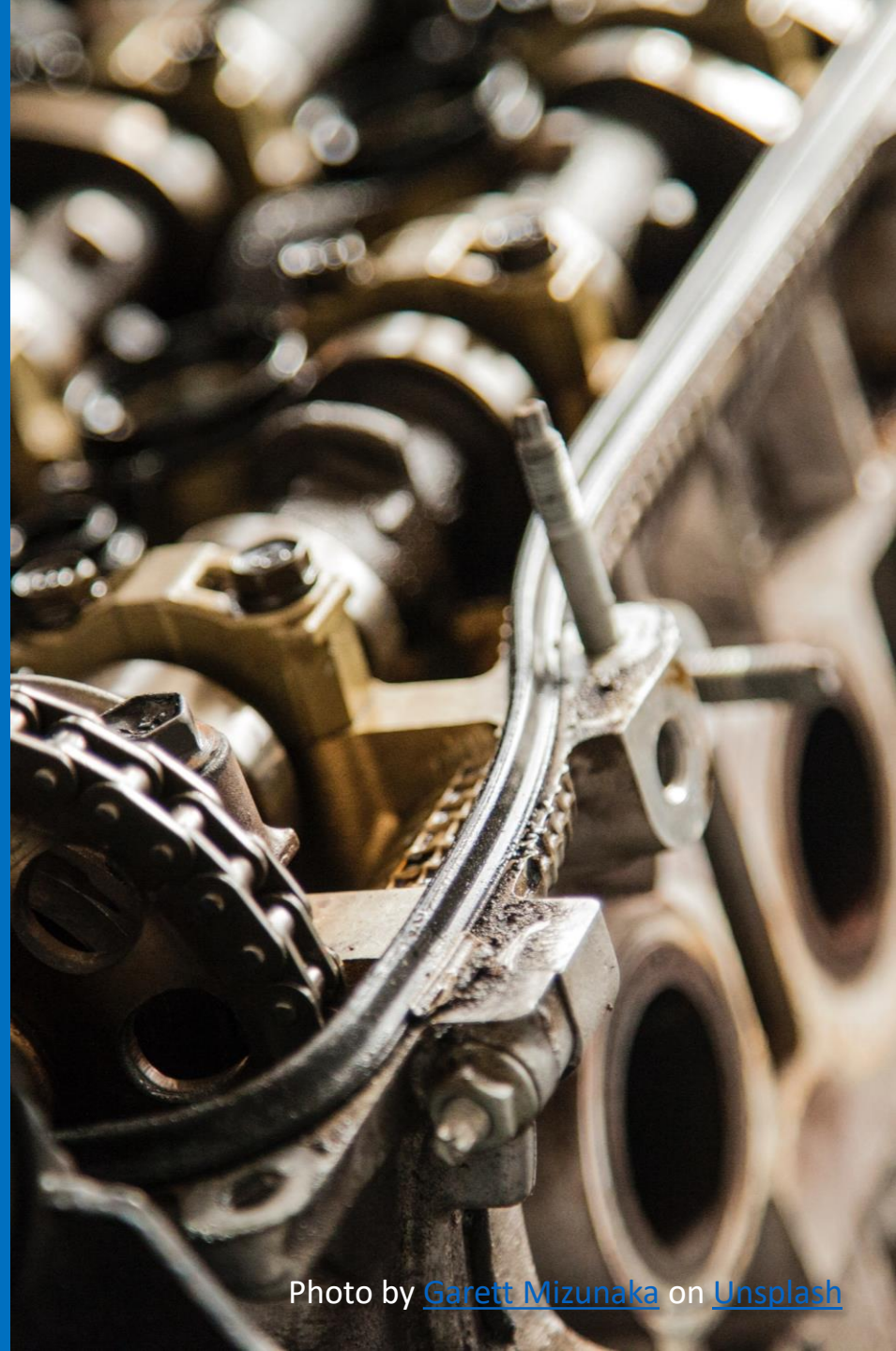
# Language Features

## Advanced Functions

## Built-In Validation



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# Leverage Built-In Validation

## #Requires

States code pre-requisites

```
#Requires -Version <N>[.<n>]
#Requires -PSSnapin <PSSnapin-Name> [-Version <N>[.<n>]]
#Requires -Modules { <Module-Name> | <Hashtable> }
#Requires -ShellId <ShellId>
#Requires -RunAsAdministrator
```

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# Leverage Built-In Validation

## Parameter Attributes

- Mandatory
- HelpMessage*

*Populates Function help

```powershell
function Start-DeathStar {
    [CmdletBinding()]
    Param (
        [Parameter(Mandatory,
                   HelpMessage = 'Planet to target')]
        [string]
        $Target
    )
}
```

```
C:\> Start-DeathStar

cmdlet Start-DeathStar at command pipeline position 1
Supply values for the following parameters:
(Type !? for Help.)
Target: !?
Planet to target
Target:
```

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# Leverage Built-In Validation

## Validation Attributes

```powershell
function Start-DeathStar {
    Param (
        [ValidateSet(
            'Tatooine', 'Alderaan')]
        [string]$Target
    )
}
```

[ValidateCount(min, max)]

[ValidateLength(min, max)]

[ValidatePattern(<REGEX>)]

[ValidateScript({<SCRIPTBLOCK>})]

[ValidateRange(min, max)]

[ValidateSet('Value1', 'Value2')]

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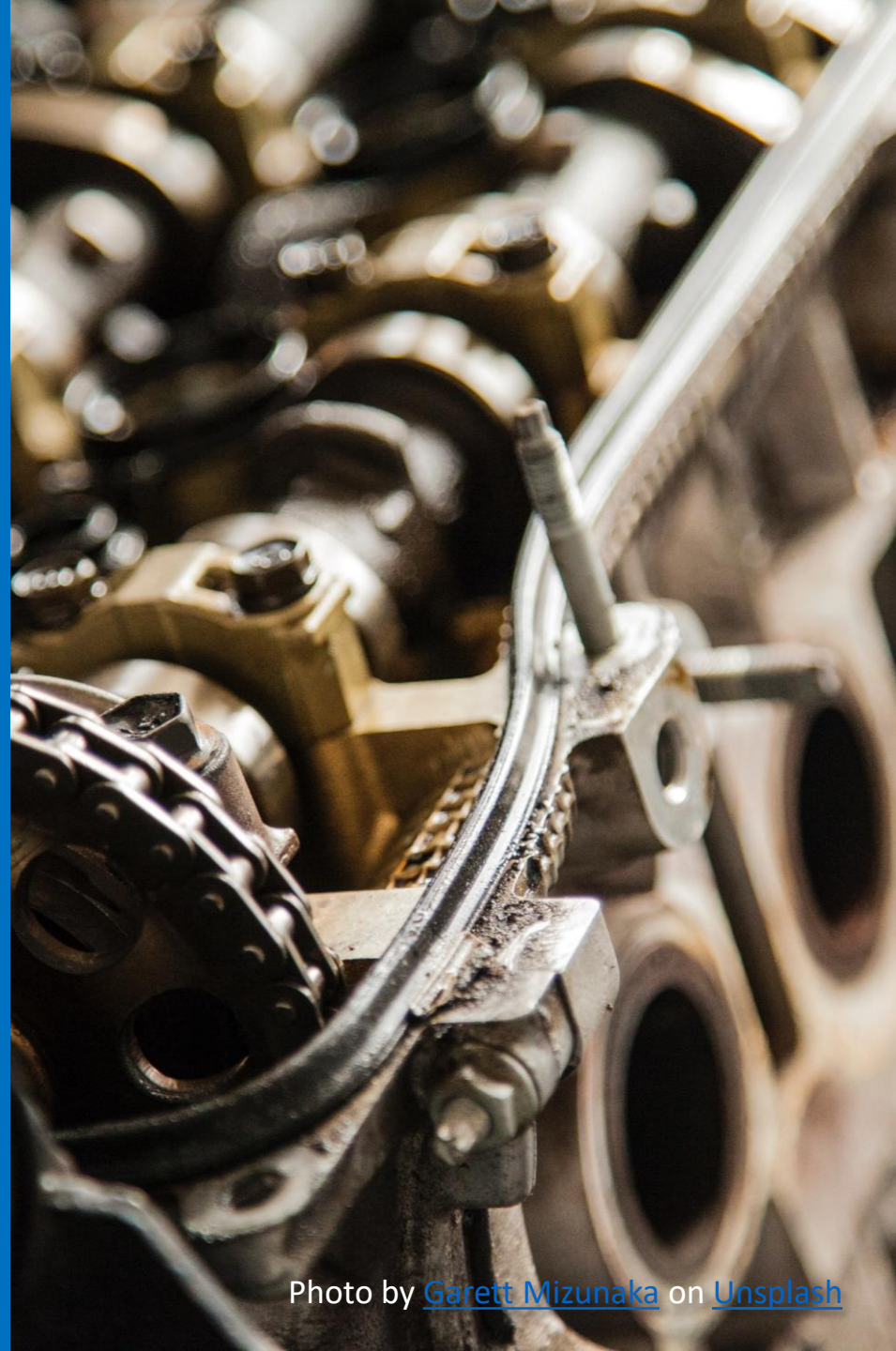
# Language Features

Advanced Functions

Built-In Validation

Use the Pipeline and Objects



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# Use the Pipeline and Objects

Get-Service | Select-Object Name | ConvertTo-Json

```
PS C:\> Get-Service | Select-Object Name | ConvertTo-Json
[
    {
        "Name":  "AdobeFlashPlayerUpdateSvc"
    },
    {
        "Name":  "AJRouter"
    },
    {
        "Name":  "ALG"
    },
```

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# Use the Pipeline and Objects

```powershell
function Test-DeathStar {
    [CmdletBinding()]
    Param (
        [Parameter(ValueFromPipeline)]
        [PsObject]$InputObject
    )

    Begin { # Execute before pipeline starts
    }

    Process { # Executes on each pipeline object
    }

    End { # Executes after all objects are
        # through the pipeline
    }
}
```

## Parameter Attribute

## Execution Blocks

- Begin
- Process
- End

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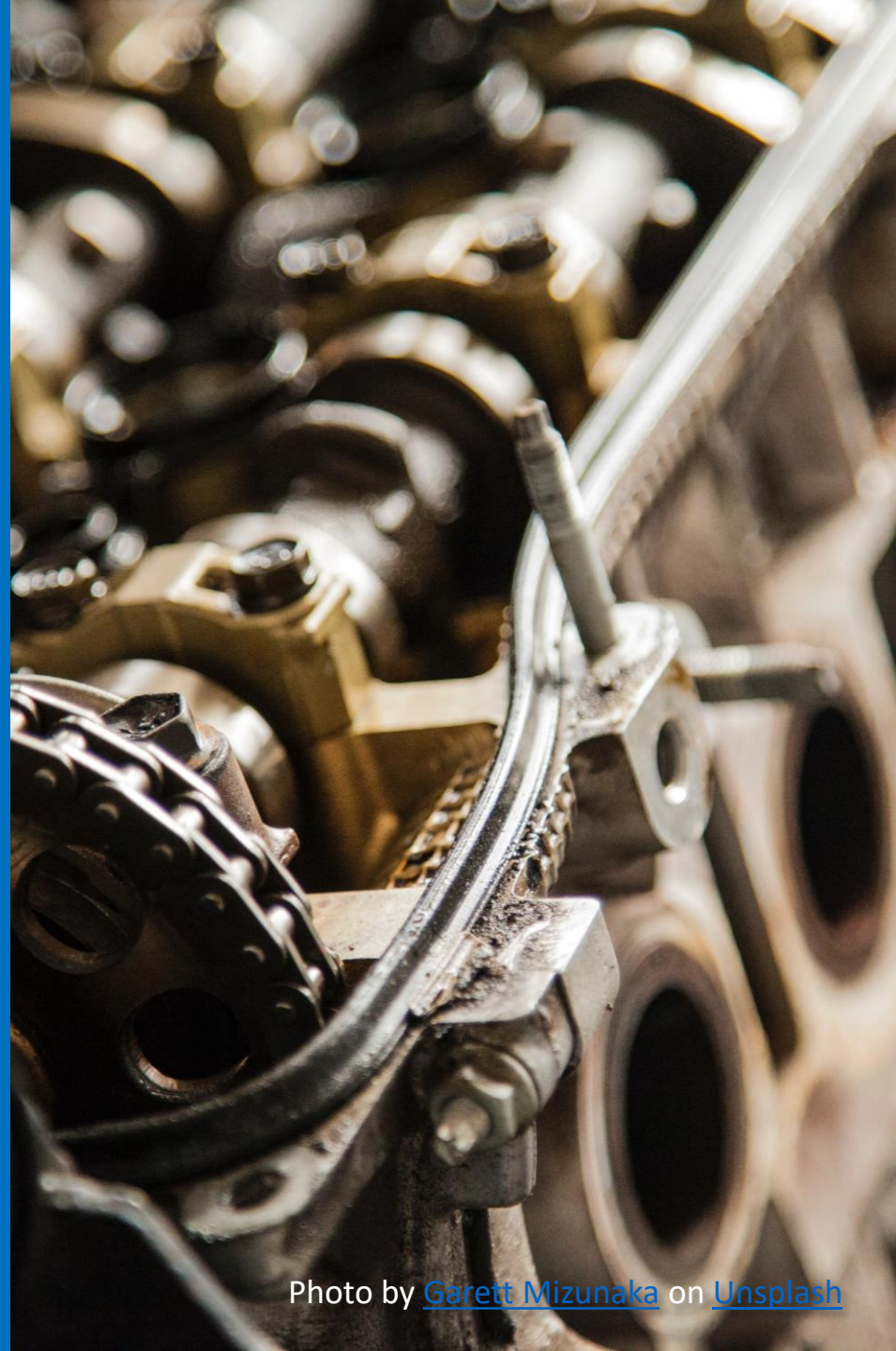
# Language Features

- Advanced Functions
- Built-In Validation
- Use the Pipeline and Objects
- Filter left, format right



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# Filter Left, Format Right


```powershell
# Measure unfiltered command
$noFilterTiming = Measure-Command{
    Get-ChildItem -Path 'C:\' -Recurse | Where-Object Extension -eq ".exe" | Select-Object FullName
}
# Measure Filter first command
$filterTiming = Measure-Command{
    Get-ChildItem -Path 'C:\' -Recurse -Filter *.exe | Select-Object FullName
}
```

00:18

00:07

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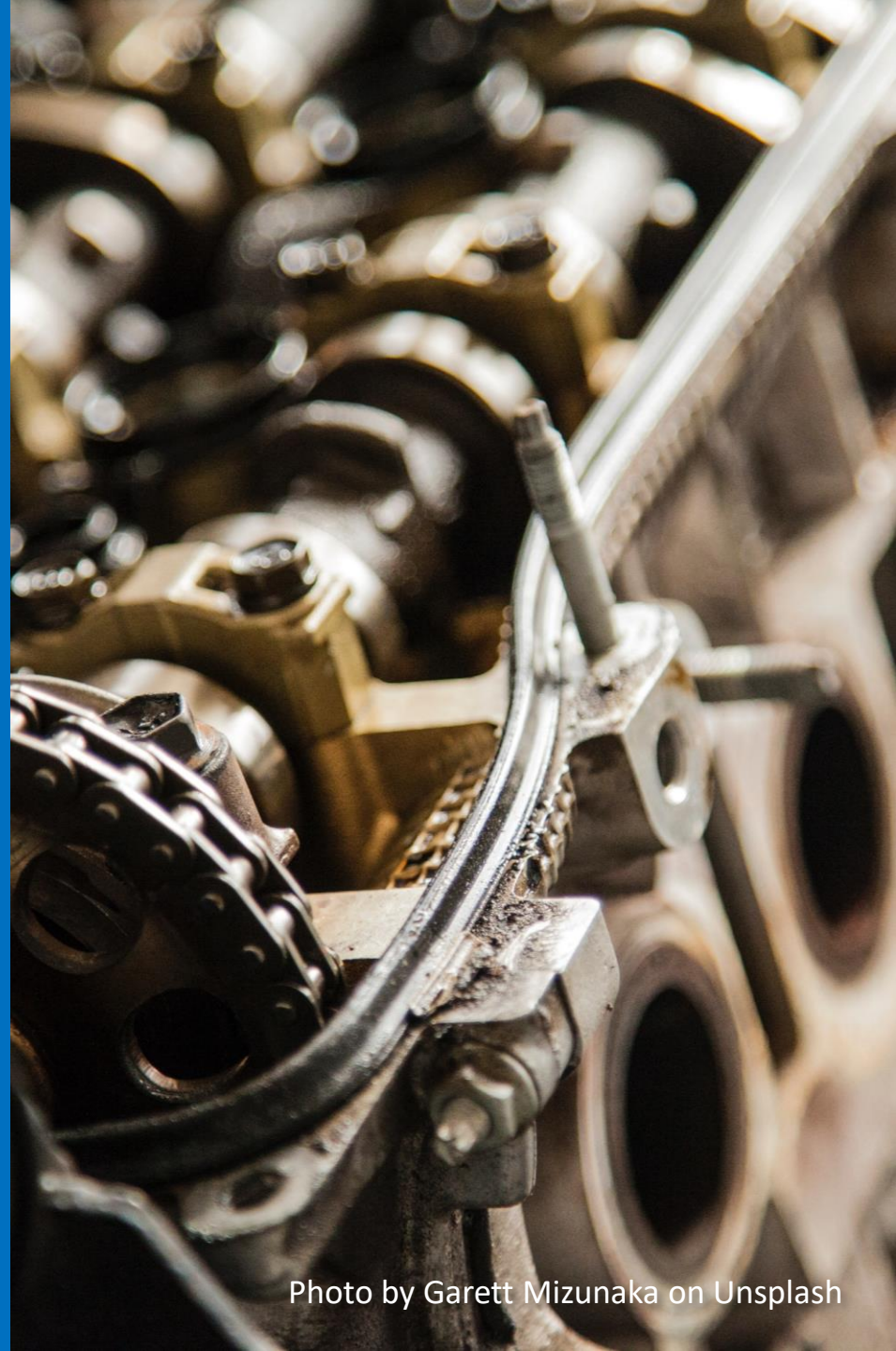
# Language Features

- Advanced Functions
- Built-In Validation
- Use the Pipeline and Objects
- Filter left, format right
- Don’t use Aliases



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# Don’t use Aliases

ls > Get-ChildItem

cd > Set-Location

cat > Get-Content

cp > Copy-Item

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# Code Review

```powershell
function Start_DeathStar {
    Param ([string]$param1)
if(!$param1){
Write-host "You didn't provide a parameter"; Return}
if ($param1 -eq "Alderaan")
{
    TurnON -param1 'Alderaan'
} else {
    turnOFF }
}

function TurnON{Param ()
    $true
}

function turnOFF{
    #this is False
    $false}
```

```powershell
# Help removed for brevity
function Start-DeathStar {
    [CmdletBinding()]
    Param (
        [Parameter(Mandatory)]
        [string]
        $Target
    )
    if ($Target -eq 'Alderaan') {
        Write-Verbose 'Targetting Alderaan'
        Enable-PlanetBlowerUpperGun
    }
    else {
        Write-Verbose 'Unknown target'
        Disable-PlanetBlowerUpperGun
    }
}
# Help removed for brevity
function Enable-PlanetBlowerUpperGun {
    [CmdletBinding()]
    Param ()

    Write-Verbose 'Enabled gun.'
}
# Help removed for brevity
function Disable-PlanetBlowerUpperGun {
    [CmdletBinding()]
    Param ()

    Write-Verbose 'Disabled gun.'
}
```

PASSED

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# Consistent Standard

Develop a consistent standard

- Read and learn from others
- Work with Project /Organisation
- Evolve your own standard
- Respect other standards
- Contribute to Open Source

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# Get Involved in Open Source

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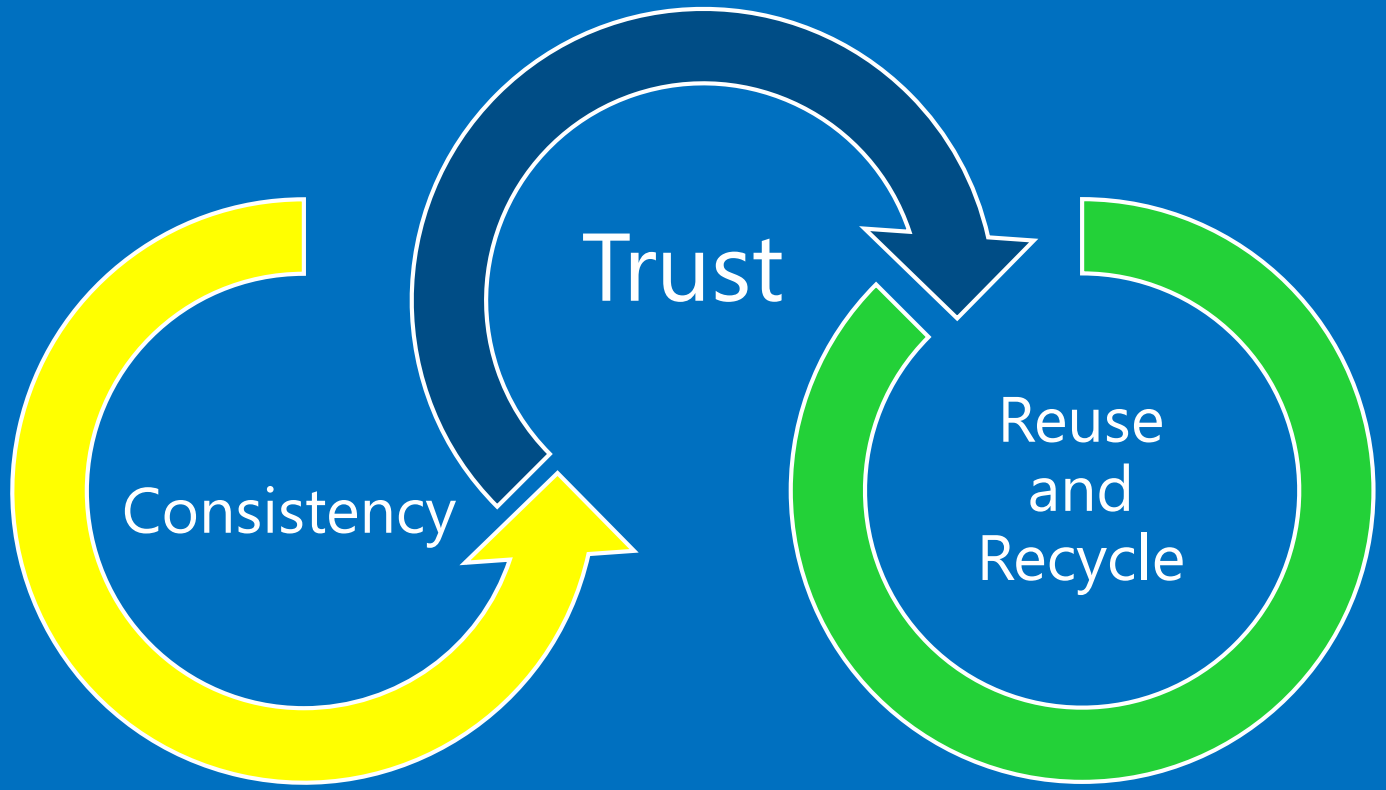
# Consistency > Trust > Reuse




**Consistency** breeds **Trust** leads to **Reuse and Recycle**

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# Thank You!

## Questions?

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# Resources

pau.by/psa

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