Using terminal and basic shell commands

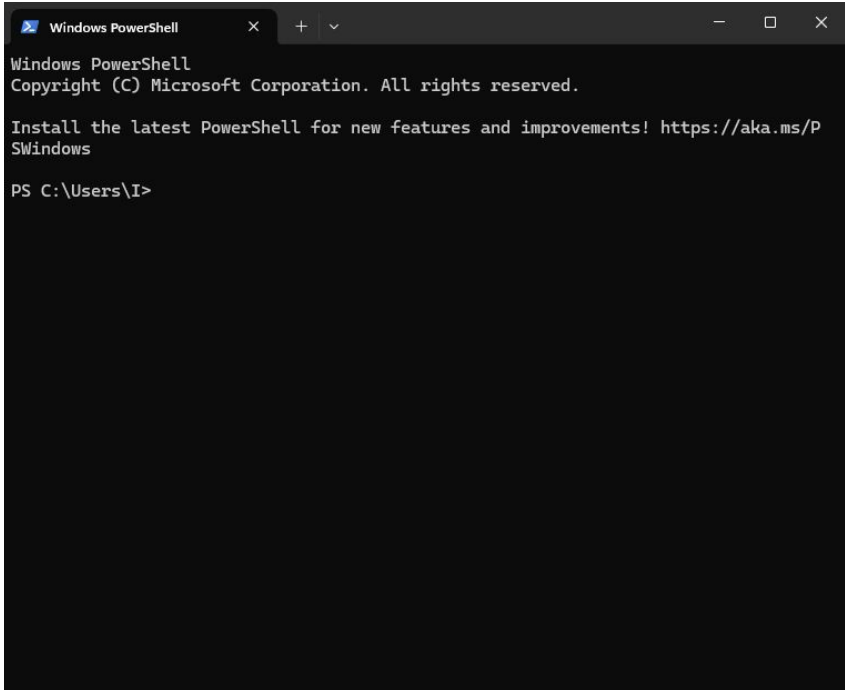
- Naimul Islam Mehedi

Why the Terminal Matters

Most junior developers treat the terminal as an optional tool. That mindset caps their growth.

In real engineering environments — devops pipelines, cloud deployments, CI/CD, automation, debugging — the terminal is the control room. The GUI shows you what exists, but the shell gives you power over it.

PowerShell, unlike CMD, is an object-oriented shell. Every output is an object, not plain text. That means you can filter, pipe, transform, and automate with precision that Linux users envy.



```
Windows PowerShell
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Install the latest PowerShell for new features and improvements! https://aka.ms/P
SWindows

PS C:\Users\I>
```
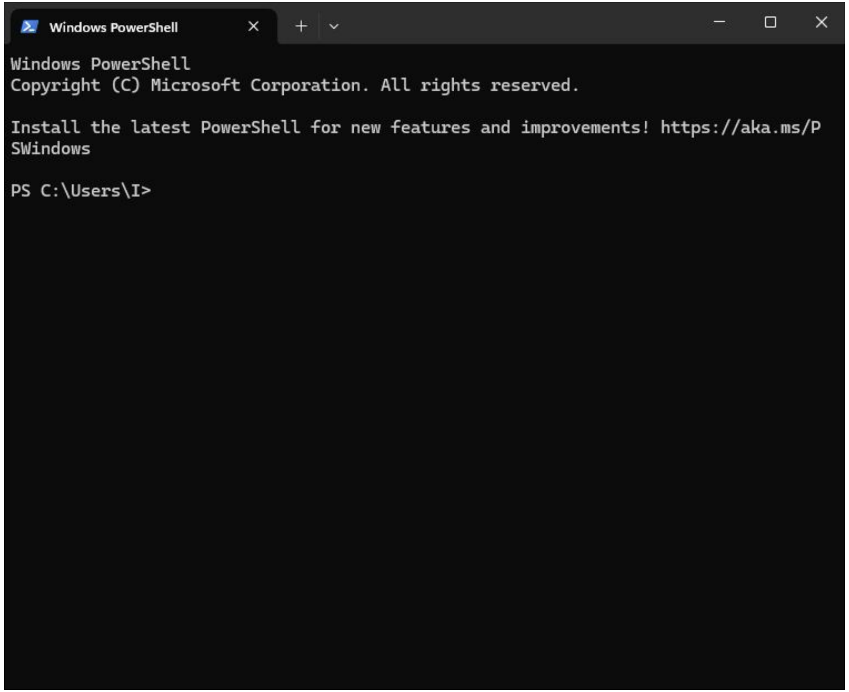

What Makes PowerShell Different

- **Everything is an object** → outputs contain structured fields.
- **Cmdlets follow Verb-Noun naming** → predictable, discoverable.
- **Powerful pipeline** → transforms objects (not text) through stages.
- **Cross-platform** → works on Windows, macOS, Linux (Core version).

Understanding this early puts you ahead of 90% of beginners.



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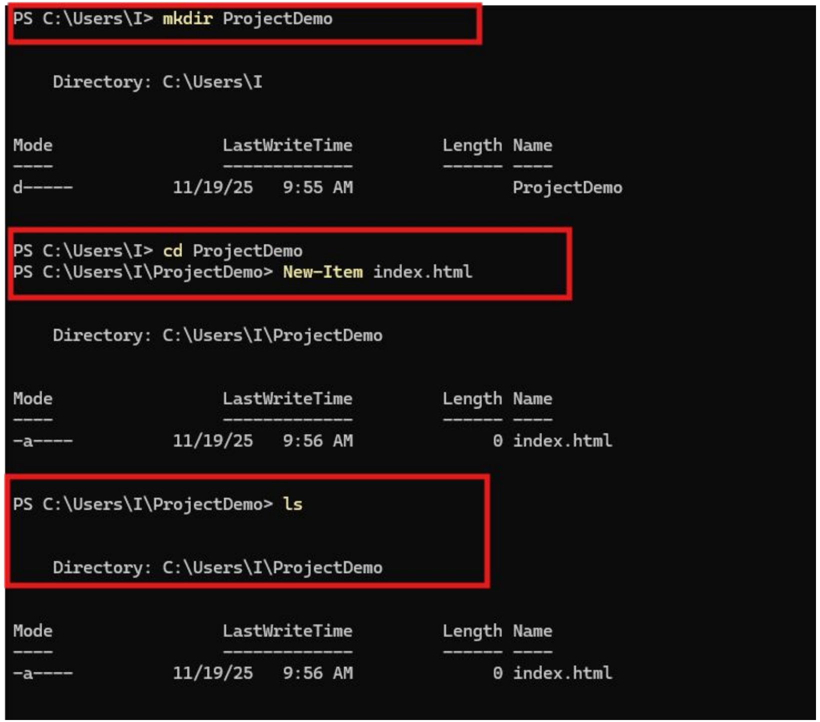
```

Navigating the File System

Navigating directories is basic, but you must treat the terminal like a cursor over the system state. You move intentionally because your commands can automate workflows, deploy builds, or wipe directories.

Purpose	Command	Notes
Show current location	`Get-Location` or `pwd`	Object output (Path field)
Change directory	`Set-Location path` or `cd path`	Works with relative & absolute paths
List files	`Get-ChildItem` or `ls`	Can filter, sort, recurse
Create folder	`New-Item -ItemType Directory name`	Avoid GUI for repeatability
Create file	`New-Item -ItemType File name.txt`	Works in scripts
Remove item	`Remove-Item path`	Use carefully — no recycle bin



```
PS C:\Users\I> mkdir ProjectDemo


    Directory: C:\Users\I


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
d-----          11/19/25   9:55 AM                ProjectDemo

PS C:\Users\I> cd ProjectDemo
PS C:\Users\I\ProjectDemo> New-Item index.html


    Directory: C:\Users\I\ProjectDemo


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----          11/19/25   9:56 AM              0 index.html

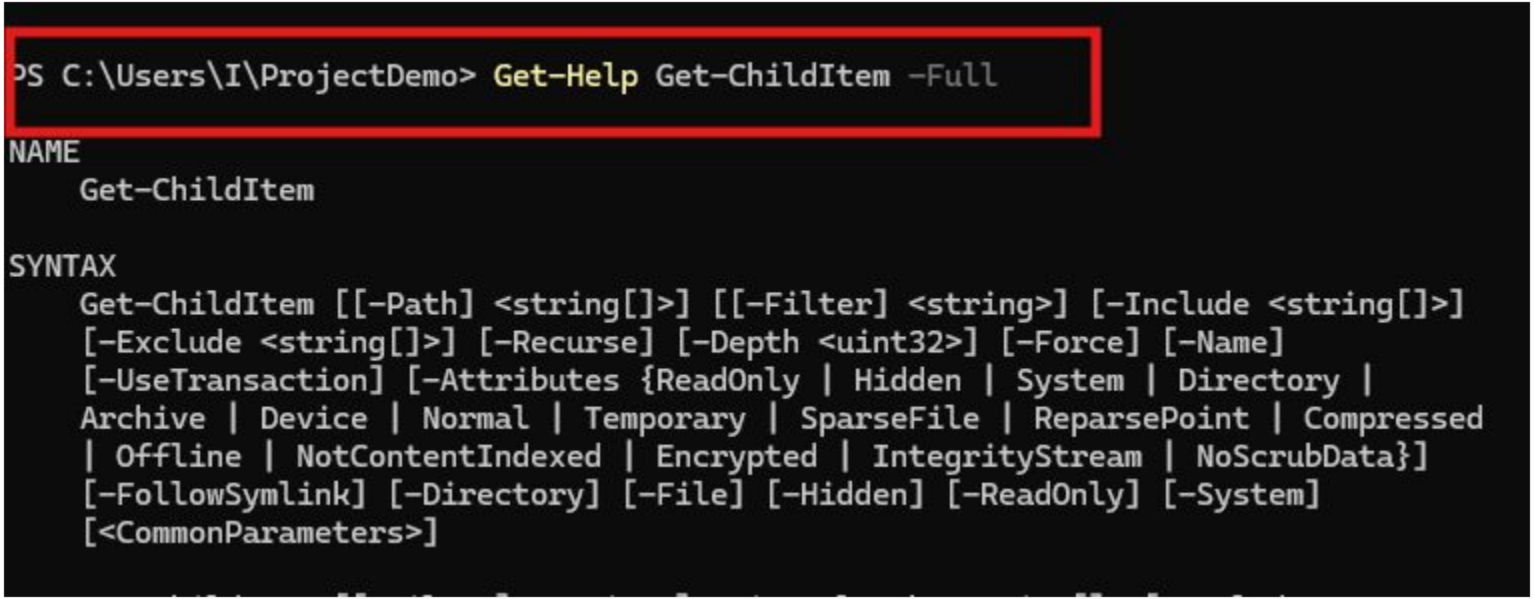
PS C:\Users\I\ProjectDemo> ls


    Directory: C:\Users\I\ProjectDemo


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----          11/19/25   9:56 AM              0 index.html
```

Understanding Cmdlets & Help System

Explore any command…



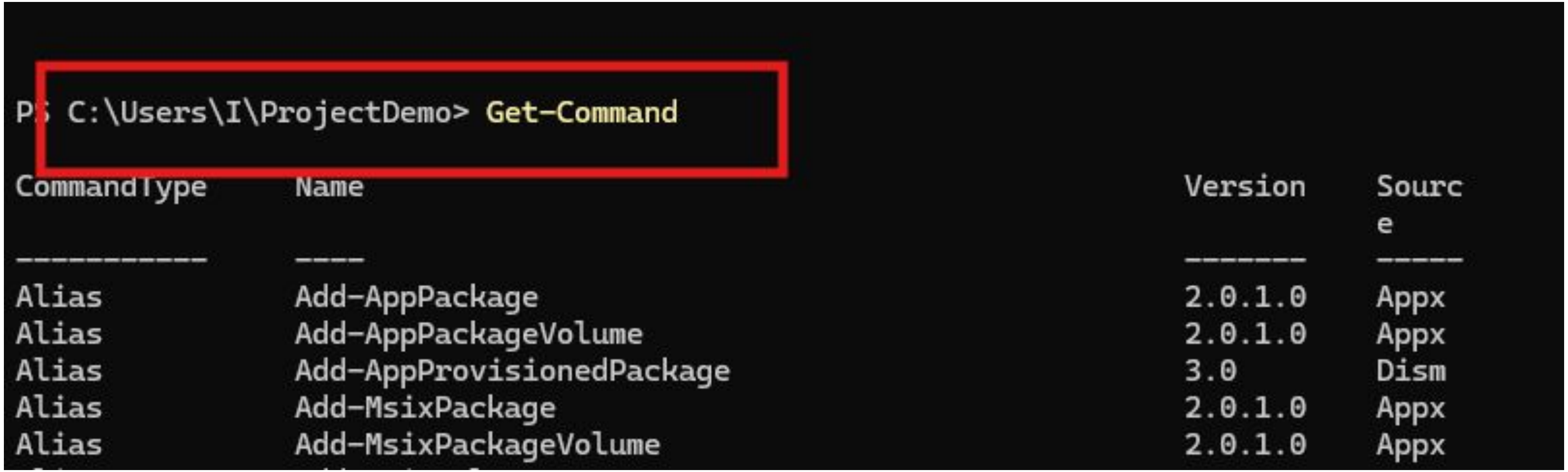
```
PS C:\Users\I\ProjectDemo> Get-Help Get-ChildItem -Full

NAME
    Get-ChildItem

SYNTAX
    Get-ChildItem [[-Path] <string[]>] [[-Filter] <string>] [-Include <string[]>]
    [-Exclude <string[]>] [-Recurse] [-Depth <uint32>] [-Force] [-Name]
    [-UseTransaction] [-Attributes {ReadOnly | Hidden | System | Directory |
    Archive | Device | Normal | Temporary | SparseFile | ReparsePoint | Compressed
    | Offline | NotContentIndexed | Encrypted | IntegrityStream | NoScrubData}]
    [-FollowSymlink] [-Directory] [-File] [-Hidden] [-ReadOnly] [-System]
    [<CommonParameters>]
```

Understanding Cmdlets & Help System

Discover available commands

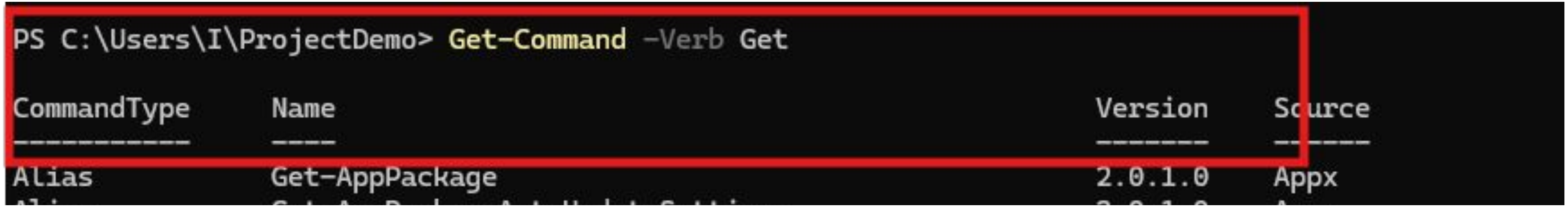


```
PS C:\Users\I\ProjectDemo> Get-Command

CommandType     Name                                               Version    Sourc
                                                                              e
-----------     ----                                               -------    -----
Alias           Add-AppPackage                                     2.0.1.0    Appx
Alias           Add-AppPackageVolume                               2.0.1.0    Appx
Alias           Add-AppProvisionedPackage                          3.0        Dism
Alias           Add-MsixPackage                                    2.0.1.0    Appx
Alias           Add-MsixPackageVolume                              2.0.1.0    Appx
```

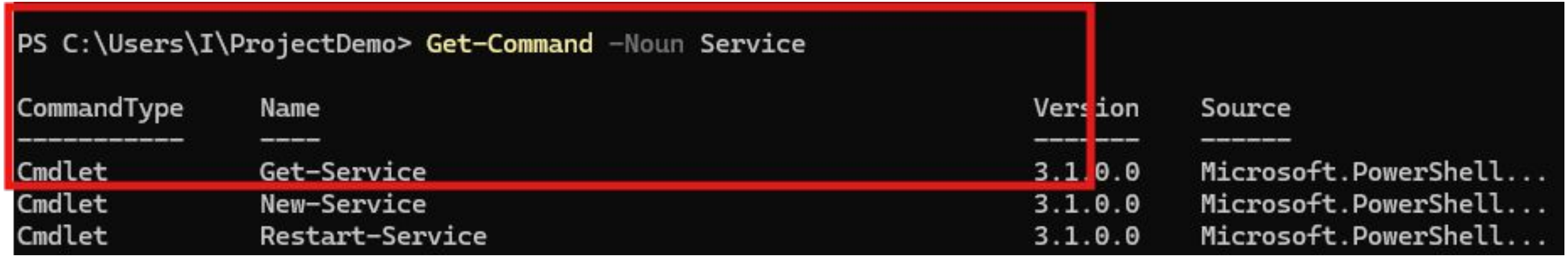
Understanding Cmdlets & Help System

Filter by verb or noun



```
PS C:\Users\I\ProjectDemo> Get-Command -Verb Get

CommandType     Name                                               Version    Source
-----------     ----                                               -------    ------
Alias           Get-AppPackage                                     2.0.1.0    Appx
```



```
PS C:\Users\I\ProjectDemo> Get-Command -Noun Service

CommandType     Name                                               Version    Source
-----------     ----                                               -------    ------
Cmdlet          Get-Service                                        3.1.0.0    Microsoft.PowerShell...
Cmdlet          New-Service                                        3.1.0.0    Microsoft.PowerShell...
Cmdlet          Restart-Service                                    3.1.0.0    Microsoft.PowerShell...
```

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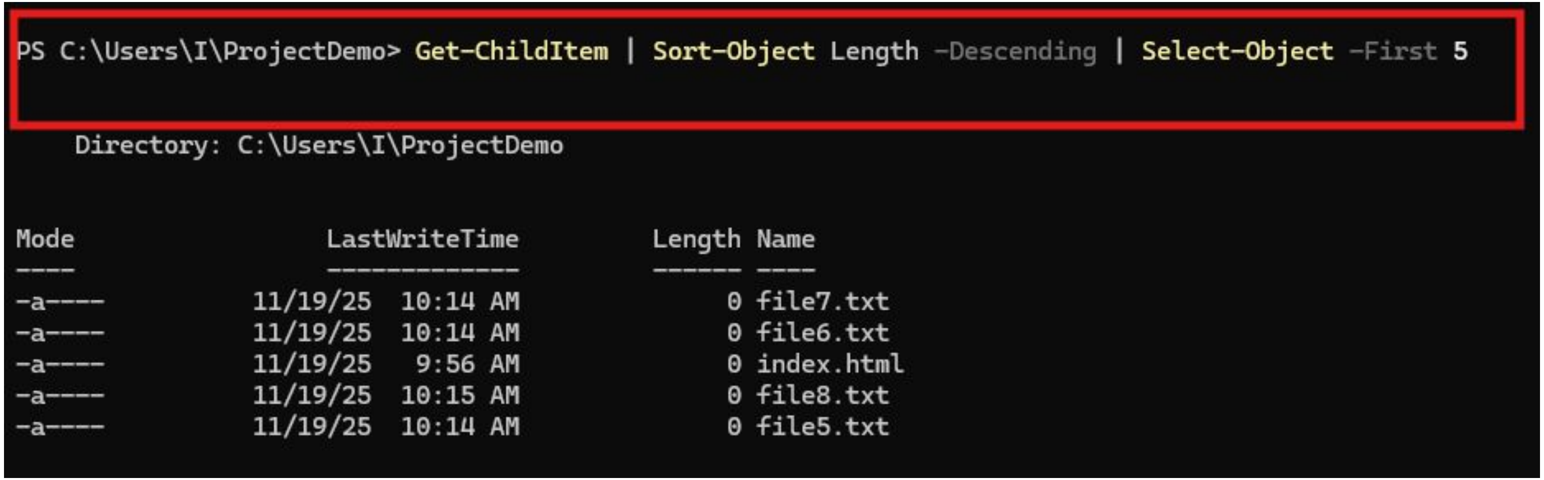
PowerShell Pipeline Mastery

Here’s where junior devs break down.

PowerShell pipes pass objects, which lets you chain operations like a data flow engine.

Example: List largest files in a folder



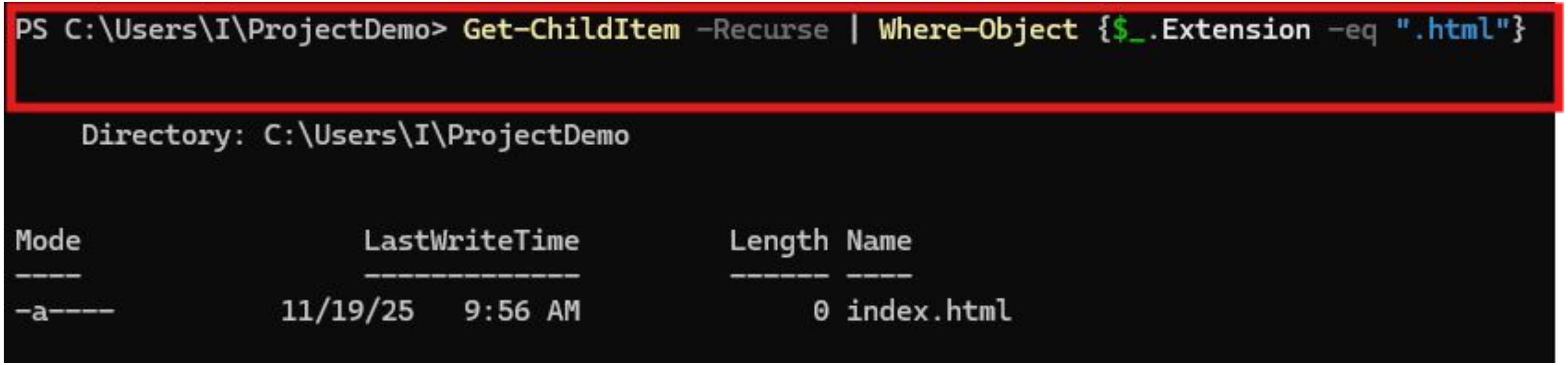
```
PS C:\Users\I\ProjectDemo> Get-ChildItem | Sort-Object Length -Descending | Select-Object -First 5


    Directory: C:\Users\I\ProjectDemo


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----          11/19/25  10:14 AM              0 file7.txt
-a----          11/19/25  10:14 AM              0 file6.txt
-a----          11/19/25   9:56 AM              0 index.html
-a----          11/19/25  10:15 AM              0 file8.txt
-a----          11/19/25  10:14 AM              0 file5.txt
```

PowerShell Pipeline Mastery

Example: Find only .html file



```
PS C:\Users\I\ProjectDemo> Get-ChildItem -Recurse | Where-Object {$_.Extension -eq ".html"}


    Directory: C:\Users\I\ProjectDemo


Mode                 LastWriteTime         Length Name
----                 -------------         ------ ----
-a----          11/19/25   9:56 AM              0 index.html
```

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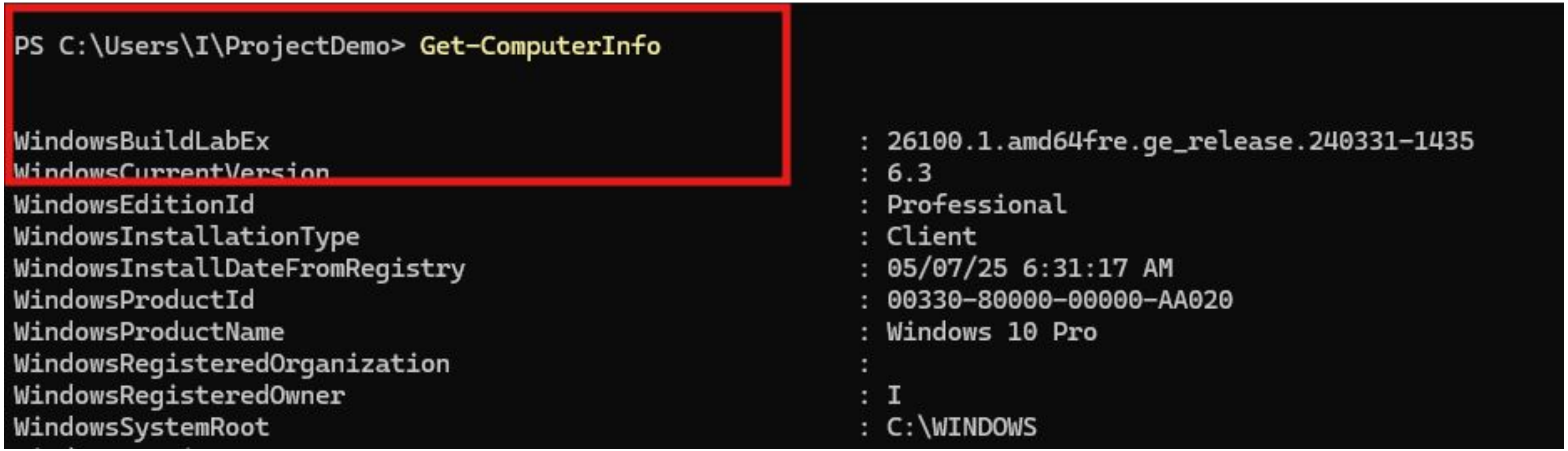
System Information & Diagnostics

You cannot be a real engineer without knowing how to interrogate the system.

Check OS Details

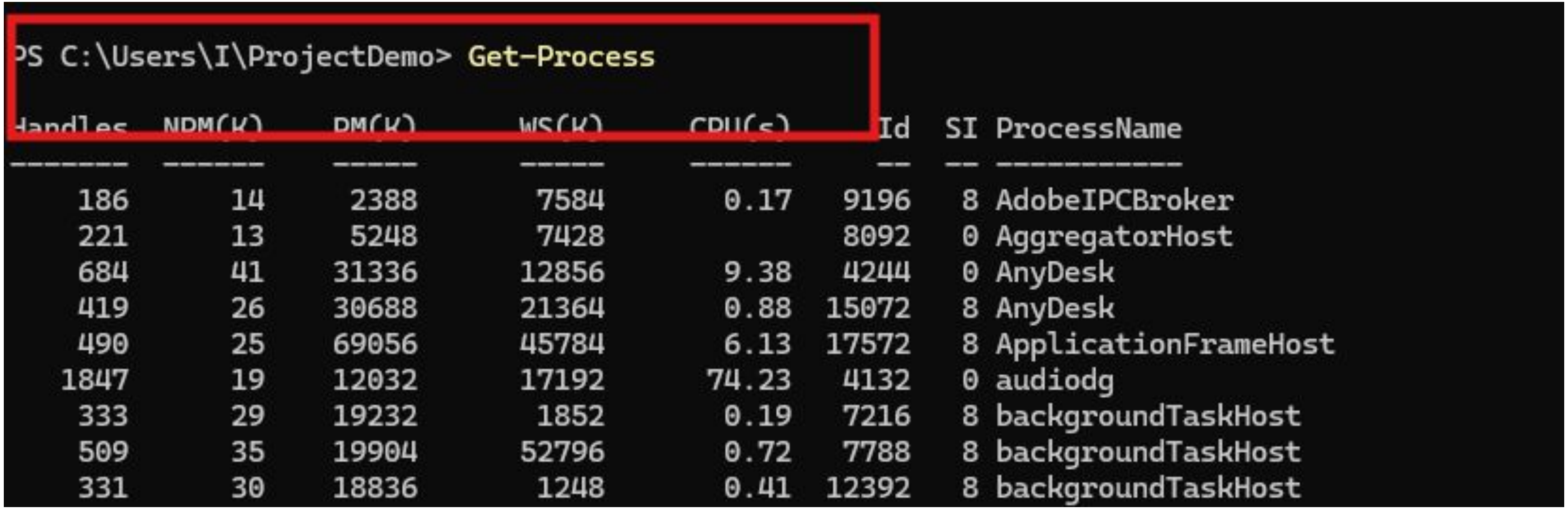


```
PS C:\Users\I\ProjectDemo> Get-ComputerInfo


WindowsBuildLabEx                                        : 26100.1.amd64fre.ge_release.240331-1435
WindowsCurrentVersion                                    : 6.3
WindowsEditionId                                         : Professional
WindowsInstallationType                                  : Client
WindowsInstallDateFromRegistry                           : 05/07/25 6:31:17 AM
WindowsProductId                                         : 00330-80000-00000-AA020
WindowsProductName                                       : Windows 10 Pro
WindowsRegisteredOrganization                            :
WindowsRegisteredOwner                                   : I
WindowsSystemRoot                                        : C:\WINDOWS
```

System Information & Diagnostics

Check running processes

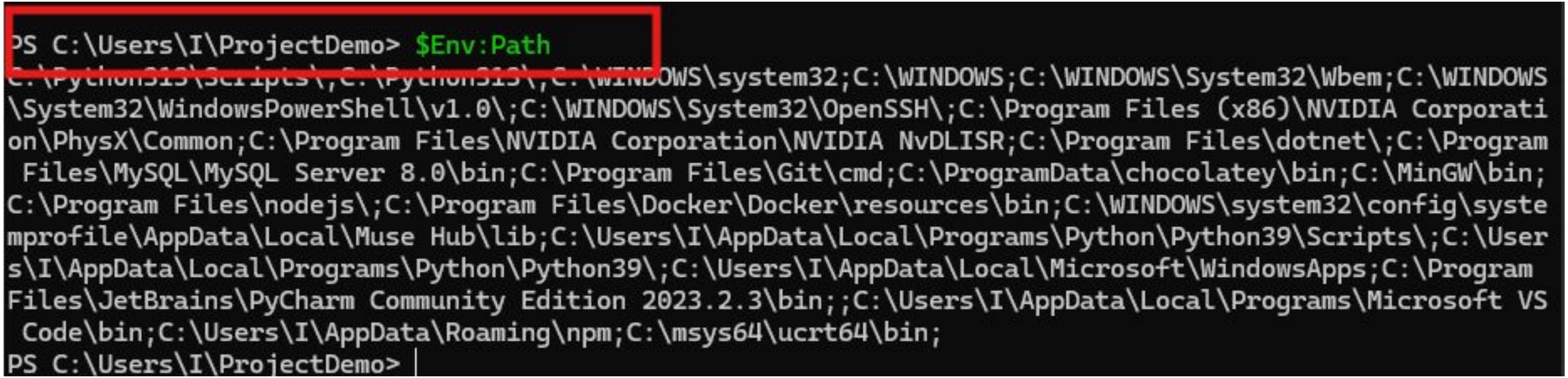


```
PS C:\Users\I\ProjectDemo> Get-Process

Handles  NPM(K)    PM(K)      WS(K)     CPU(s)     Id  SI ProcessName
-------  ------    -----      -----     ------     --  -- -----------
    186      14     2388       7584       0.17   9196   8 AdobeIPCBroker
    221      13     5248       7428              8092   0 AggregatorHost
    684      41    31336      12856       9.38   4244   0 AnyDesk
    419      26    30688      21364       0.88  15072   8 AnyDesk
    490      25    69056      45784       6.13  17572   8 ApplicationFrameHost
   1847      19    12032      17192      74.23   4132   0 audiodg
    333      29    19232       1852       0.19   7216   8 backgroundTaskHost
    509      35    19904      52796       0.72   7788   8 backgroundTaskHost
    331      30    18836       1248       0.41  12392   8 backgroundTaskHost
```

System Information & Diagnostics

Environment Variables



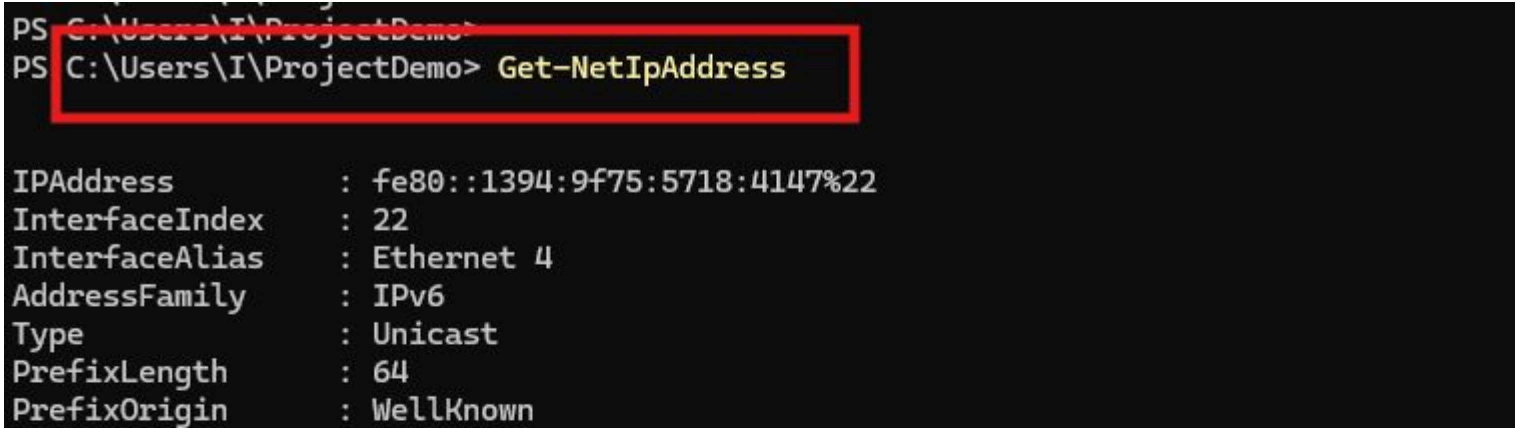
```
PS C:\Users\I\ProjectDemo> $Env:Path
C:\Python313\Scripts\;C:\Python313\;C:\WINDOWS\system32;C:\WINDOWS;C:\WINDOWS\System32\Wbem;C:\WINDOWS
\System32\WindowsPowerShell\v1.0\;C:\WINDOWS\System32\OpenSSH\;C:\Program Files (x86)\NVIDIA Corporati
on\PhysX\Common;C:\Program Files\NVIDIA Corporation\NVIDIA NvDLISR;C:\Program Files\dotnet\;C:\Program
 Files\MySQL\MySQL Server 8.0\bin;C:\Program Files\Git\cmd;C:\ProgramData\chocolatey\bin;C:\MinGW\bin;
C:\Program Files\nodejs\;C:\Program Files\Docker\Docker\resources\bin;C:\WINDOWS\system32\config\syste
mprofile\AppData\Local\Muse Hub\lib;C:\Users\I\AppData\Local\Programs\Python\Python39\Scripts\;C:\User
s\I\AppData\Local\Programs\Python\Python39\;C:\Users\I\AppData\Local\Microsoft\WindowsApps;C:\Program
Files\JetBrains\PyCharm Community Edition 2023.2.3\bin;;C:\Users\I\AppData\Local\Programs\Microsoft VS
 Code\bin;C:\Users\I\AppData\Roaming\npm;C:\msys64\ucrt64\bin;
PS C:\Users\I\ProjectDemo>
```

Network & Internet Commands

Developers often ignore networking until they’re stuck.

A senior engineer doesn’t wait for the problem — they inspect proactively.

Check IP Config

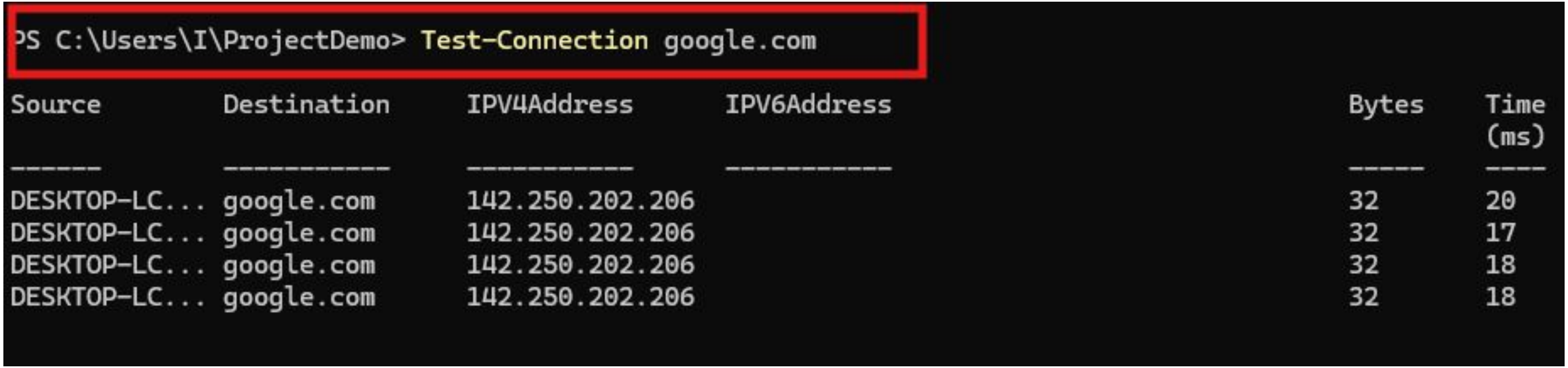


```
PS C:\Users\I\ProjectDemo>
PS C:\Users\I\ProjectDemo> Get-NetIpAddress


IPAddress         : fe80::1394:9f75:5718:4147%22
InterfaceIndex    : 22
InterfaceAlias    : Ethernet 4
AddressFamily     : IPv6
Type              : Unicast
PrefixLength      : 64
PrefixOrigin      : WellKnown
```

Network & Internet Commands

Check IP Config



```
PS C:\Users\I\ProjectDemo> Test-Connection google.com

Source        Destination     IPV4Address      IPV6Address                                  Bytes    Time
                                                                                                     (ms)
------        -----------     -----------      -----------                                  -----    ----
DESKTOP-LC... google.com      142.250.202.206                                               32       20
DESKTOP-LC... google.com      142.250.202.206                                               32       17
DESKTOP-LC... google.com      142.250.202.206                                               32       18
DESKTOP-LC... google.com      142.250.202.206                                               32       18
```

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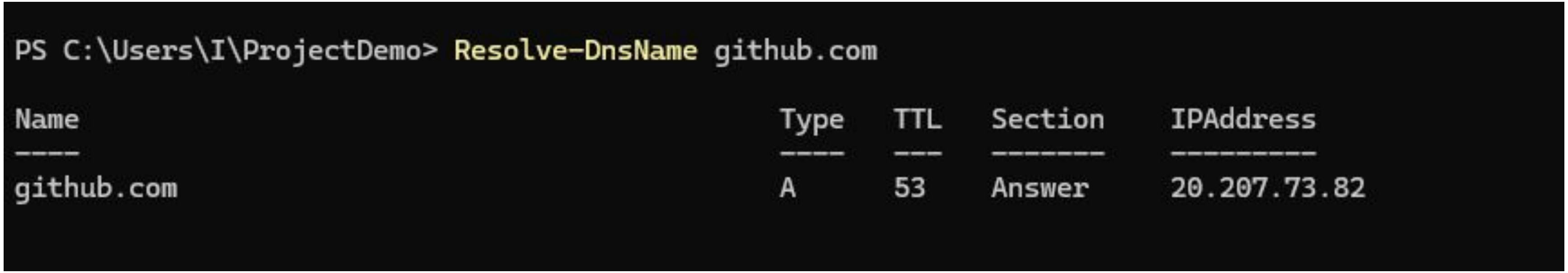
Network & Internet Commands

DNS lookup

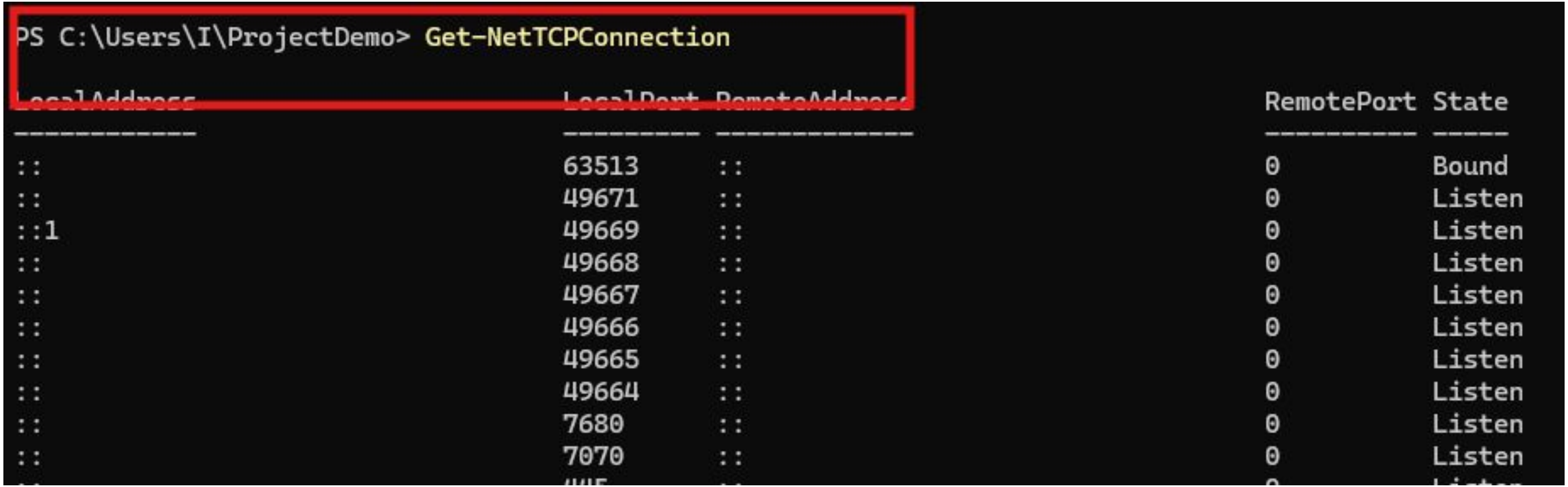


```
PS C:\Users\I\ProjectDemo> Resolve-DnsName github.com

Name                                           Type   TTL   Section    IPAddress
----                                           ----   ---   -------    ---------
github.com                                     A      53    Answer     20.207.73.82
```

Network & Internet Commands

Open ports

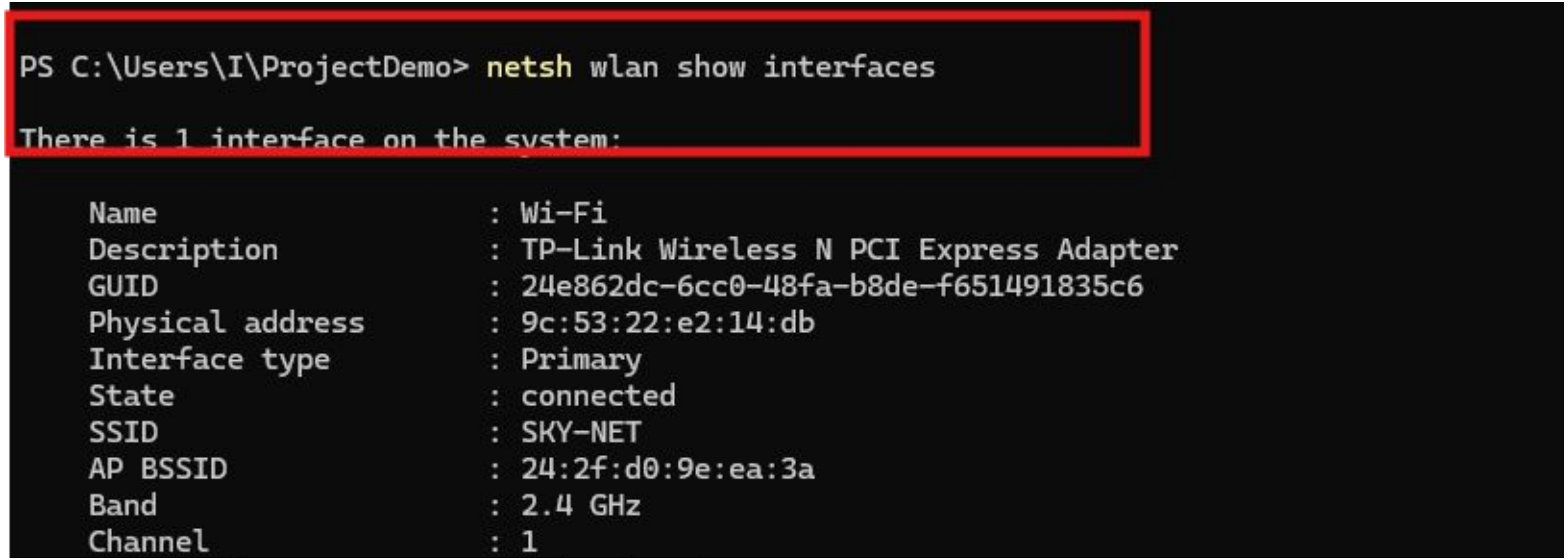


```
PS C:\Users\I\ProjectDemo> Get-NetTCPConnection

LocalAddress                        LocalPort RemoteAddress                        RemotePort State
------------                        --------- -------------                        ---------- -----
::                                  63513     ::                                   0          Bound
::                                  49671     ::                                   0          Listen
::1                                 49669     ::                                   0          Listen
::                                  49668     ::                                   0          Listen
::                                  49667     ::                                   0          Listen
::                                  49666     ::                                   0          Listen
::                                  49665     ::                                   0          Listen
::                                  49664     ::                                   0          Listen
::                                  7680      ::                                   0          Listen
::                                  7070      ::                                   0          Listen
```

Network & Internet Commands

Check Wi-Fi details



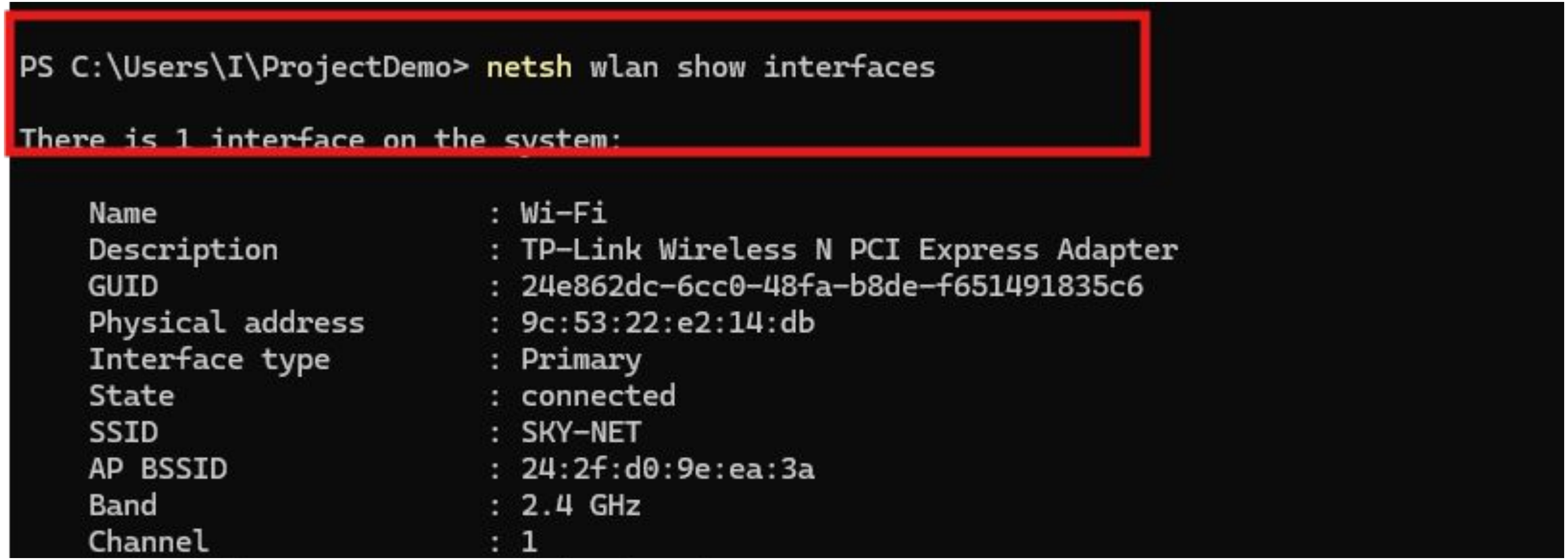
```
PS C:\Users\I\ProjectDemo> netsh wlan show interfaces

There is 1 interface on the system:

    Name                   : Wi-Fi
    Description            : TP-Link Wireless N PCI Express Adapter
    GUID                   : 24e862dc-6cc0-48fa-b8de-f651491835c6
    Physical address       : 9c:53:22:e2:14:db
    Interface type         : Primary
    State                  : connected
    SSID                   : SKY-NET
    AP BSSID               : 24:2f:d0:9e:ea:3a
    Band                   : 2.4 GHz
    Channel                : 1
```

Network & Internet Commands

Check Wi-Fi details



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    SSID                   : SKY-NET
    AP BSSID               : 24:2f:d0:9e:ea:3a
    Band                   : 2.4 GHz
    Channel                : 1
```
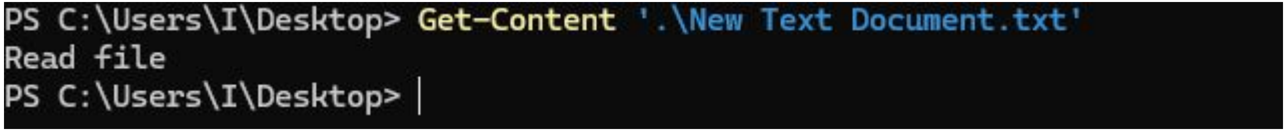

File Content Manipulation

Read file



```
PS C:\Users\I\Desktop> Get-Content '.\New Text Document.txt'
Read file
PS C:\Users\I\Desktop> |
```