

# PowerShell Fundamentals

## Introduction

Hello World

Simon

simon.wahlin@advania.com

@SimonWahlin

Björn

bjorn.sundling@advania.com

@Bjompen

Emanuel

emanuel.palm@advania.com

@PalmEmanuel

John

john.roos@advania.com

@johnmroos

Emil

emil.gullbrandsson@advania.com

@emilguden

Jens

jens.nilsson@advania.com

@nilssonjensa

Stefan

stefan.ivemo@advania.com

@StefanIvemo

You

Get-Participant

Get-Expectation

Agenda

PowerShell Command Structure

Finding Commands

.NET Framework

Variables

Input & Output

Pipelines

PSDrives

Working with Text

Script Flow - Conditions & Loops

PowerShell Remoting

Tools

Version Control

Scripting Best Practices

Bring Your Own Lab

What is PowerShell

History

Why use PowerShell?

Versions

Windows PowerShell (1-5)

PowerShell Core (6)

PowerShell (7)

Modules

Execution Policy

Safety - Not Security!

Lab 00 - Install PowerShell & VSCode (link)

## Try Along!

### PowerShell Command Structure

Verbs

Nouns

- Parameters
  - Common Parameters
    - WhatIf
  - Custom Parameters
- Lab 01 - Running Commands

## **Finding Commands**

- Get/Update/Save -Help
- Get-Command
- Get-Verb
- Aliases
- Show-Command
  - How to Install for Cross-Platform
- Lab 02 - PowerShell Help

## **.NET Framework**

- Objects
  - PowerShell Objects
  - Types
  - Members
  - Properties
  - Methods
  - Referencing Properties or Calling Methods
- Get-Member
  - InputObject
  - \$MyObject | Get-Member
- Lab 03 - Commands and Methods

## **Variables**

- Goal: Don't Repeat Yourself!
- Types
  - Numbers
  - Text
  - Lists
    - Array
    - Hashtables
- Parentheses
- Casting
  - Implicit
  - Explicit
- Environment Variables
- Output Variables
- Built-In Variables
  - Preferences
  - Error
  - ErrorView
  - PSVersionTable
  - Env:PSModulePath
- Get-ChildItem Variable:
- Lab 04 - Variables

## **Input & Output**

- Input
  - Read-Host
    - Can handle secure input!
  - Parameters
- Output
  - Write-Host & Write-Output
  - Streams
    - Output
    - Verbose

- Debug
- Warning
- Error
  - Get-Error
- Information
- Out-\* commands

Lab 05 - Input & Output

## **Pipelines**

- Linking Commands
  - Pipeline Input
- Formatting
  - Format-Table
  - Format-List
  - Changes Output
- Filtering
  - Select-Object
  - Where-Object
  - Sort-Object
  - Group-Object
    - AsHashTable
- Out-GridView
  - Passthrough
- \$PSItem/\$\_

Lab 06 - Pipelines

## **PSDrives**

- Providers
  - FileSystem
  - Registry
  - Cert
  - AD
  - Azure
- Navigation and Exploration
  - Get-Command \*Item\*
  - Get-ChildItem
  - Get/Set -Location

Lab 07 - PSDrives

## **Working with Text**

- Variables in Text
  - Single vs Double Quotes
  - Implicit ToString()
- Expressions
- Multiline Strings
- String Manipulation
  - Replace
  - Trim
  - Split
  - Join
  - Case Sensitivity
- Regex
  - Match
  - Replace
- Commands
  - \*-Content
    - Raw
    - Tail
  - Out-File
  - Select-String

- Recursive File Search
- AllMatches
- ConvertTo-\* / ConvertFrom-\*
- Export-\* / Import-\*
- Encoding
  - \$OutputEncoding
- Text Types
  - JSON
  - XML
  - HTML
- Lab 08 - Text

## **Script Flow**

- Loops
  - ForEach-Object
    - \$PSItem/\$\_
  - foreach
  - for
  - Keywords
    - break
    - continue
    - return
  - Behaviors in Pipelines
- Conditions
- Operators
  - Comparisons
    - eq / -ne
    - gt / -lt
    - ge / -le
    - like / -notlike
    - contains / -notcontains
    - in / -notin
  - Case Sensitivity
  - Compare-Object
  - Explicit / Implicit
- Logical
  - and / -or
  - not
- Range
- if
- switch
- Loops with Conditions
  - while
  - do while
  - do until

Lab 09 - Conditions & Loops

## **PowerShell Remoting**

- PSSessions
- Invoke-Command
  - Parallel
- Using: Local Variables
- Security
  - Network Logon
  - Mutual Trust
  - Encryption
- HTTP / HTTPS / SSH
- Lab 10 - Remoting

## **Tools**

Editor

- ISE (Deprecated)

- VS Code

  - Workspace

  - Create Scripts

  - Move Line

  - Change All Occurrences

  - Format Document

PSGallery

Windows Terminal

## **Version Control**

git

- GitHub

- Azure DevOps

- GitLab

- Bitbucket

svn

## **Best Practices**

Performance

- Filter left - Format right

- Measure-Command

- Pipelines

- Avoid Console Output

- Arrays

Readability

- Don't Use Aliases

Verb-Noun

\$null on left side comparison

VSCoade Extensions

Don't run unknown code!

## **The Winner Takes it All!**

### **Megalab**

### **More Reading**

PowerShell Documentation ([link](#))

PSKoans ([link](#))

Community Best Practices ([link](#))

Learn PowerShell in a Month of Lunches, Linux and macOS Edition

PowerShell User Group Sweden ([link](#))