Module 5

Advanced Functions

- Cmdletbinding
- Scopes
- Splatting
- Document Scripts
- Signing Scripts
- PowerShell Web Access

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CmdletBinding()

Overview

- Characteristics
- Implementation

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CmdletBinding()

Opportunities with CmdletBinding

- **With CmdletBinding() a function became an advanced function**
- **With CmdletBinding() you get for your script or function**
  - Automatic parameter check
  - Write-Verbose
  - -WhatIf and –Confirm
  - Common parameter
- **Implementation**
  - [CmdletBinding()] before param() section
  - Possible attributes
    - SuppotsShouldProcess=$true|$false
    - ConfirmImpact = ‘Low’|‘Medium’|‘High’ (overrides $ConfirmPreference)
    - HelpURI=‘http://www.Microsoft.com’
    - SupportsPaging=$true|$false (Link in Notes)

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CmdletBinding()

- **Automatic parameter check**
  - *Without* CmdletBinding() all parameter are available in the function
  - *With* CmdletBinding() only those which are defined in the param-section

```
Function Do-Foo
{
   param ( $a )

   "This is `$a:"
   $a

   "This is `$args:"
   $args
}

Do-Foo -a 1 "Color"

Result:
This is $a:
1
This is $args:
Color
```

```
Function Do-Foo
{
   [Cmdletbinding()]

   param ( $a )

   "This is `$a:"
   $a

   "This is `$args:"
   $args
}

Do-Foo -a 1 "Color"

Result:
ERROR …
```


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CmdletBinding()

- **Write-Verbose – Requirements**
  - CmdletBinding()
  - Call the function with -Verbose

```
Function Do-Foo
{
   [Cmdletbinding()]

   param ( $a )

   "This is `$a:"
   $a

   Write-Verbose "This is a bit more information."
}

Do-Foo -a "Color" -Verbose

Result:
This is $a:
Color
This is a bit more information.
```


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CmdletBinding()

- **ShouldProcess**
  - Enables –WhatIf and/or –Confirm and/or –Verbose
  - Use $PSCmdlet.ShouldProcess() in if condition
    - If ($PSCmdlet.ShouldProcess("Target"))
    - If ($PSCmdlet.ShouldProcess("Target", "Action"))
    - If ($PSCmdlet.ShouldProcess("verboseDescription","verbosWarning","Caption"))
- **HelpURI**
  - Implementation: [CmdletBinding(HelpURI="Http://www.help.gv.at")]
  - Usage: get-help function -online

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Scopes

How to work with different scopes for variables in scripts with functions

- **Name and number**
  - Scopes in Windows PowerShell have both names and numbers. The named scopes specify an absolute scope. The numbers are relative and reflect the relationship between scopes. (Source: get-help about_Scopes)
- **Scopes**
  - Global
    - The scope started with PowerShell.exe.
  - Local
    - The current scope.
  - Script
    - Variables created in a script. This scope is created by starting a script. For a script, the current scope is the local scope.
  - Private
    - Variables created in a private scope cannot be seen outside the current scope

Scopes

What is and how to use Dot Sourcing?

- **Modifiers**
  - Identically to scope name
  - Available for variables, functions, aliases

```
$[<scope-modifier>]:<name> = <value>
$global:Status = "Open"
New-Variable -Name myVar -Value 123 -Option Private
```

```
Function Private:Do-Foo
{
   …
}
```

```
New-Alias -Name def -Value Get-Help -Option Private
```

Splatting

What is splatting and when it is useful?

```
Splatting is a method of passing a collection of parameter
values to a command as unit. (about_Splatting)
```

- **Parameters are passed as hashtable**
  - Create a hashtable with @{ }
  - Key-value-pairs: parametername1=parametervalue1;parametername2=parametervalue2
  - Use hashtable with @hashtablename
- **Scripts/functions**
  - Intrinsic $PSBoundParameters
  - $PSBoundParameters is changeable
    - .Add(…); .Remove(“ …”); .[“…”]=newvalue
- **Usefull for**
  - Cmdlets with many parameters
  - Proxy functions

Documenting a Script

How to add a documentation to a function or script

- **<# … #>**
  - At the beginning
  - Two free lines before first function declaration (!!!)
- **Tags**
  - .SYNOPSIS
  - .DESCRIPTION
  - .PARAMETER
  - .EXAMPLE
  - .INPUTS
  - .OUTPUTS
  - .NOTES
  - .LINK
  - …

Signing Scripts

Overview

Signing with CA

Signing with SSC

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Signing Scripts

Why and ways to sign scripts

- **What does signed scripts provide?**
  - Identity of the source of code
  - Detection of script modification
- **A code signing certificate is required**
- **.. and could received from**
  - Certification Authority
  - Self signed

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Sign scripts with an enterprise CA

How to sign scripts with an enterprise CA

1. Prepare a code signing template at the CA
2. Request a certificate by the script developer
3. Sign the script and test it
4. Deploy code signing certificate in the enterprise

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Sign scripts with an enterprise CA

How to sign scripts with an enterprise CA

1. Prepare a code signing template at the CA

- **Use certtmpl.msc**
- **Copy existing Code Signing certificate**
- **Change any necessary attributes**
- **Grant at least one user or group the Enroll permission**
- **Add this new template to your CA**

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Sign scripts with an enterprise CA

How to sign scripts with an enterprise CA

2 Request a certificate by the script developer

- **Use certmgr.msc**
- **Request a Certificate based on the new template**
- **Use the button Properties to "Make private key exportable"**
  - if not configured in template

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Sign scripts with an enterprise CA

How to sign scripts with an enterprise CA

3 Sign the script and test it

- **Save certificate in a variable (it's useful)**
- **Use Set-AuthenticodeSignature cmdlets**
  - -Filepath pathtothescript.ps1
  - -Certificate $certificate

```
$cert = Get-Childitem cert:\CurrentUser\My -CodeSigningCert
Set-AuthenticodeSignature -FilePath c:\temp\Script.ps1 -Certificate $cert
```

- **Hint**
  - Use –TimeStampServer timestampserver to run the signed script even the certificate has expired.
  - At the end of the script the signature block was added
  - After changing the script use Set-AuthenticodeSignature again (!!!)
  - Get-AuthenticodeSignature gets detailed information about the signer certificate

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Sign scripts with an enterprise CA

How to sign scripts with an enterprise CA

4 Deploy code signing certificate in the enterprise

- **Do this to avoid confirmation to run a signed script**

- **Use certmgr.msc to export the code signing certificate**
  - WITHOUT the private key (!!!)
- **Deploy it via GPO to all computers on which the signed script has to run without confirmation**
  - Place it in to the container “Trusted Publishers”

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Sign Scripts with a self signed certificate

How to sign scripts with a self signed certificate

- **Similar to the process with an enterprise CA**
- **Use makecert.exe**
  - to generate a Root Certificate
  - to generate a Signing Certificate
  - Available in Windows SDK
- **Step 3 and 4 are the same**
- **Hint**
  - https://technet.microsoft.com/de-de/magazine/2008.04.powershell.aspx
  - https://gallery.technet.microsoft.com/scriptcenter/Self-signed-certificate-5920a7c6

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PowerShell Web Access

Overview

Requirements

Installation

Configuration and Use

Test

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PowerShell Web Access - Requirements

What are the requirements for the PowerShell Web Access

- **Windows Server 2012 or Windows Server 2012 R2**
- **Internet Information Server 8**
- **.Net Framework 4.5**

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PowerShell Web Access

How to Install the PowerShell Web Access

1	Install Windows Feature via Server Manager or PowerShell
2	Install WebSite and/or certificate, ApplicationPool and a virtual directory
3	Add one or more authorization rule
4	Test the certificate, name resolution and authorization rule(s)

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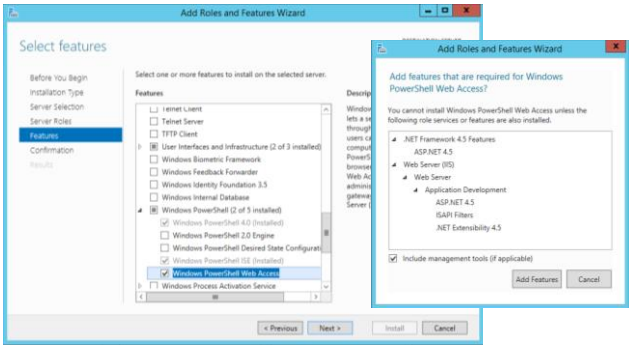
PowerShell Web Access - Installation

How to Install the PowerShell Web Access

1	Install Windows Feature via Server Manager or PowerShell




```
Install-WindowsFeature -Name WindowsPowerShellWebAccess -IncludeAllSubFeature
```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PowerShell Web Access - Installation

How to Install the PowerShell Web Access

2 Install WebSite and/or certificate, ApplicationPool and a virtual directory

- **Internet Information Services (IIS) Manager (manually)**
  - WebSite
  - Certificate (a self-signed certificate is also possible)
- **PowerShell (automatically)**
  - ApplicationPool
  - Virtual directory
  - Hints:
    - Installation into the root not possible (e.g. https://psweb.kurs.at); a virtual directory is mandatory (https://tools.kurs.at/psweb)
    - Default Web Site is used if no –WebSiteName is given
    - Default virtual directory name is /pswa

```
Install-PswaWebApplication   -WebSiteName 'IIS-Website-Name'
                             -WebApplicationName 'VirtDir-Name'
                             -UseTestCertificate
```


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PowerShell Web Access - Configuration

How to Install the PowerShell Web Access

3 Add one or more authorization rule

```
Add-PswaAuthorizationRule -ComputerName * -UserName * -ConfigurationName *
Add-PswaAuthorizationRule -ComputerName 'Kurs\Srv9' -UserName *
Add-PswaAuthorizationRule -ComputerName * -UserName 'Kurs\HarryP'

Add-PswaAuthorizationRule    -ComputerGroupName 'Kurs\AdminStation'
                             -UserGroupName 'Kurs\Admins'
```

- **-ComputerName / -ComputerGroupName**
  - Where the PS Web Access User has to connect from
- **-UserName / -UserGroupName**
  - Which user(s) are allowed to use the PowerShell Web Access
- **-ConfigurationName**
  - Name of a PSRemoting configuration

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PowerShell Web Access

How to Install the PowerShell Web Access

4 Test the certificate, nameresolution and authorization rule(s)

```
Test-PswaAuthorizationRule -ComputerName srv1.kurs.at -UserName Kurs\HarryP
```

- **Shows all rules which allow the use of PowerShell Web Access**
- **-ComputerName**
  - Mandatory; Where the PS Web Access User has to connect from
- **-UserName**
  - Mandatory; Which user(s) should be tested

```
Get-PswaAuthorizationRule
Remove-PswaAuthorizationRule -Id 0
```

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Do You Have Any Questions?

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