

Managing VI3 with PowerShell

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the official dutch
vmug



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Hoeveel VCP'ers zijn er nu eigenlijk in Nederland, België, Luxemburg en wereldwijd ?



Nederland : 1789 **12 %**



België : 226



Luxemburg : 22



Wereldwijd : 15000



LinkedIn : 2023



Eric Sloof and Viktor van den Berg on K-ARL TV





- **PowerShell introductie**
- VMware Cmdlets
- VI Toolkit Extensions
- Voorbeelden
- Integratie in de Infrastructure Client
- Diverse PowerShell tools
- Links



PowerShell werkt met standaard Windows commando's en applicaties. Alles wat je nu al weet hoef je dus niet over boord te gooien.

PowerShell introduceert een krachtig nieuw type commando. Commandlets gebruiken een begrijpelijke schrijfwijze en hebben grote voordelen ten opzichte van bestaande commando's.

PowerShell is object georiënteerd. Het werken met gestructureerde objecten is een stuk efficiënter dan het werken met platte tekst.



PowerShell.exe

```
C:\Windows\System32\WindowsPowerShell\v1.0\PowerShell.exe
PS C:\> dir

Directory: Microsoft.PowerShell.Core\FileSystem::C:\

Mode                LastWriteTime         Length Name
----                -
d-----          25-8-2008             2 .
d-----          17-9-2008             2 ..
d-----          21-4-2008             2 .NET
d-----          15-9-2008             1 .NETFramework
d-----          13-4-2008             2 .NETFramework6
d-----          28-9-2008             2 .NETFramework6
d-r-----        21-9-2008             1 .NETFramework6
d-----          17-9-2008             1 .NETFramework6
d-----          28-9-2008             2 .NETFramework6
d-r-----        30-12-2007             1 .NETFramework6
d-----          27-6-2008             1 .NETFramework6
d-----          18-9-2008             1 .NETFramework6
d-----          24-9-2008             1 .NETFramework6
-a-----          24-9-2008             1 .NETFramework6
-ar-s-----        18-1-2007             2 .NETFramework6
-a-----          2-5-2007              1 .NETFramework6

PS C:\> _
```

Gpowershell.exe

Graphical Windows PowerShell

File Edit View Runspace Help

Script Editor

Service Name	Status	Display Name
WinHttpAutoProx...	Stopped	WinHTTP Web Proxy Auto-Discovery Se...
Winmgmt	Running	Windows Management Instrumentation
WinRM	Stopped	Windows Remote Management (WS-Manag...
Wlansvc	Running	WLAN AutoConfig
wmiApSrv	Stopped	WMI Performance Adapter
WMPNetworkSvc	Running	Windows Media Player Network Sharin...
WPCSvc	Stopped	Parental Controls
WPDBusEnum	Running	Portable Device Enumerator Service
wscsvc	Running	Security Center
WSearch	Running	Windows Search
wuauerv	Running	Windows Update
wudfsvc	Running	Windows Driver Foundation - User-mo...

PS C:\Users\Eric Sloof>

Get-Service

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Gestructureerde commando's (Cmdlets)

Naast de ondersteuning voor traditionele Windows executables, introduceert PowerShell een nieuw type commando met de naam command-let.

```
C:\Windows\System32\WindowsPowerShell\v1.0\PowerShell.exe
PS C:\Users\Eric Sloof> Get-Process -Name power*

Handles  NPM(K)  PM(K)  WS(K)  UM(M)  CPU(s)  Id  ProcessName
-----  -
      445     20    29892  46840   252    60,25  5692  POWERPNT
      294      6    31388  28608   161     1,02  5036  powershell

PS C:\Users\Eric Sloof> _
```

Get-Process -Name power* of

Get-Pr<Tab> -N<Tab> power* of gtp power*



PowerShell werkt met een gestructureerde toegang tot de eigenschappen van een object.

```
PS> "VMUG event 2008"  
VMUG event 2008
```

```
PS> "VMUG event 2008".Length  
15
```

De **"VMUG event 2008"** string is een volledig functioneel object binnen het .NET Framework, ieder object kan opgeslagen worden in een (\$) variabele.

```
PS> $MijnProces = Get-Process notepad  
PS> $MijnProces.Kill()
```



PowerShell kan heel goed gebruikt worden om administratieve taken uit te voeren. Stel dat je wilt weten hoeveel Cd's er nodig zijn voor een back-up van een 20 GB harddisk.

```
PS> 20GB / 650MB  
31,5076923076923
```

Of je wil uitrekenen hoeveel dagen we nog moeten wachten tot de eerste kerstdag. 😊

```
C:\> $kerst = [DateTime] "12/25/2008" - [DateTime]::now  
C:\> $kerst.Totaldays  
13
```



Wanneer er output door een commando wordt gegenereerd dan kan deze output doorgesluisd worden naar een ander commando.

Hiervoor wordt het pipeline | karakter gebruikt.

Get-Vm | Get-Snapshot | Remove-Snapshot

Een Snapshot is net als een ...

- Je kunt niet zonder.
- Je moet ze de ruimte geven.
- Niet te lang aan laten staan.
- Ze worden snel vergeten. 😊



Alle COM objecten die beschikbaar zijn binnen Windows kunnen vanuit PowerShell worden aangesproken.

```
$Voice = New-Object -com SAPI.SpVoice  
$Voice.Speak( "Network problems", 1 )
```

Dit geldt ook voor de ADSI interface, SQL server, Exchange, de WMI interface, enzovoort.

```
$Dom = 'LDAP://DC=dc;DC=ntpro'  
$Root = New-Object DirectoryServices.DirectoryEntry $Dom  
Write-host "PowerShell connects to domain: $Dom"
```



Integratie met andere VMware Producten

Naast de 125 standaard Commandlets voor VI3 heeft VMware ook Commandlets gecreëerd die gebruikt kunnen worden in combinatie met de Update Manager (VUM) en de Site Recovery Manager (SRM).

Update Manager

Het Downloaden van updates, scannen van een ESX server en het uitvoeren van een remediation kan gedaan worden op basis van 13 extra VUM Commandlets.

Site Recovery Manager

Mike Laverick, de auteur van het boek “Administering VMware Site Recovery Manager”, beschrijft in zijn boek welke rol PowerShell kan spelen bij het inrichten van een SRM omgeving.



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VMware heeft 125 Commandlets gecreëerd. De belangrijkste functie groepen zijn Get, Move, New, Remove en Set.

VIserver
VIserver
Task
View
VIOBJECTBYVIVIEW
VIToolkitConfiguration
VIToolkitVersion
Task
VMHost
Template
CDDrive
Cluster
CustomField
Datacenter
Datastore
FloppyDrive
Folder
HardDisk
NetworkAdapter
OSCustomizationSpec
ResourcePool
Template
VirtualPortGroup
VirtualSwitch
VM
VMHostAccount
VMHostNetworkAdapter
CDDrive
Cluster
CustomField
Datacenter
Datastore

FloppyDrive
Folder
HardDisk
NetworkAdapter
OSCustomizationSpec
ResourcePool
Template
VirtualPortGroup
VirtualSwitch
VIToolkitConfiguration
VM
VMHost
VMHostAccount
VMHostNetwork
VMHostNetworkAdapter
VMHostStartPolicy
VMStartPolicy
Tools
VMHostFirmware
Tools
Cluster
Datacenter
Folder
Inventory
ResourcePool
VM
VMHost
Snapshot
CDDrive
Cluster
CustomField
Datacenter

Datastore
FloppyDrive
Folder
Inventory
NetworkAdapter
OSCustomizationSpec
ResourcePool
Snapshot
Template
VirtualPortGroup
VirtualSwitch
VM
VMHost
VMHostAccount
VMHostNetworkAdapter
VMGuest
VMHostService
Snapshot
VMHostFirmware
VMGuest
VMHostService
Task
VM
VMHostService
VM
VMGuest
Tools
CDDrive
Cluster
Datacenter
Datastore

FloppyDrive
Folder
HardDisk
Inventory
NetworkAdapter
OSCustomizationSpec
ResourcePool
Snapshot
VirtualPortGroup
VirtualSwitch
VM
VMGuest
VMHost
VMHostAccount
VMHostNetwork
VMHostStartPolicy
VMHostStorage
VMStartPolicy
Log
LogType
Stat
VIEvent
VMHostService
VMHostSnmp
VMHostService
VMHostSnmp
VMHostSnmp
VMHostSnmp
VMHostModule
VMHostModule



Add-PSSnapin VMware.VimAutomation.Core

`$Server = Connect-VIServer -Server esx.ntpro.local -User root -Password vmware`

Get-VM

```
C:\Windows\System32\WindowsPowerShell\v1.0\PowerShell.exe

Name           : VMware.VimAutomation.Core
PSVersion      : 1.0
Description    : This Windows PowerShell snap-in contains Windows PowerShell cmdlets used to manage VMware Infrastructure.

PS C:\Users\Eric Sloof> $Server = Connect-VIServer -Server 192.168.75.128 -User root -Password vmware
There were one or more problems with the server certificate:

* Warning: The certificate's CN name does not match the passed value.

PS C:\Users\Eric Sloof> Get-VM

Name                PowerState Num CPUs Memory (MB)
-----
New Virtual Machine PoweredOff 1         256
Nostalgia           PoweredOff 1         64
Eric                PoweredOff 1         4

PS C:\Users\Eric Sloof> _
```




Add-PSSnapin VMware.VimAutomation.Core

`$Server = Connect-VIServer -Server esx.ntpro.local -User root -Password vmware`

Get-VirtualPortGroup

```
C:\Windows\System32\WindowsPowerShell\v1.0\PowerShell.exe
PS C:\Users\Eric Sloof> $Server = Connect-VIServer -Server 192.168.75.128 -User root -Password vmware
There were one or more problems with the server certificate:
* Warning: The certificate's CN name does not match the passed value.

PS C:\Users\Eric Sloof> Get-UM

Name                PowerState Num CPUs Memory <MB>
-----
New Virtual Machine PoweredOff 1         256
Nostalgia            PoweredOff 1         64
Eric                 PoweredOff 1         4

PS C:\Users\Eric Sloof> get-VirtualPortgroup

Name      Key                VirtualSwitch  VlanId
-----
UM Network key-vim.host.PortGroup-UM N... vSwitch0      0
Service... key-vim.host.PortGroup-Serv... vSwitch0      0

PS C:\Users\Eric Sloof>
```



Add-PSSnapin VMware.VimAutomation.Core

```
$Server = Connect-VIServer -Server esx.ntpro.local -  
User root -Password vmware
```

```
Move-VM -VM (Get-VM -Name Eric) -Destination (Get-  
ResourcePool -Name "test")
```

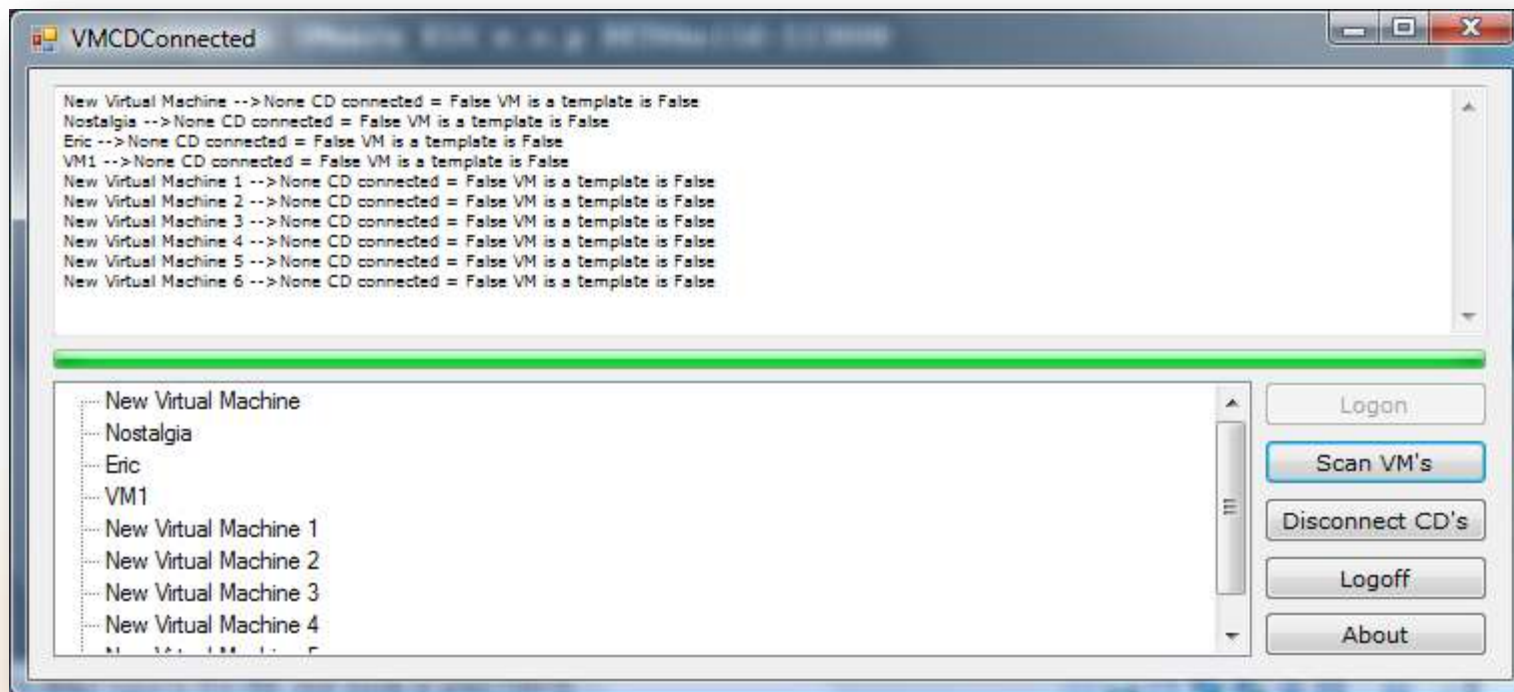
```
C:\Windows\System32\WindowsPowerShell\v1.0\PowerShell.exe  
PS C:\Users\Eric Sloof> Move-VM -VM (Get-VM -Name Eric) -Destination (Get-ResourcePool -Name "test")  


| Name | PowerState | Num CPUs | Memory (MB) |
|------|------------|----------|-------------|
| Eric | PoweredOff | 1        | 4           |

  
PS C:\Users\Eric Sloof>
```



Een handig script als je virtuele machines in een DRS cluster gehost worden. Het ontkoppelen van ISO's.



Get-VM | Get-CDDrive | Set-CDDrive -connected:\$false



Maak een Snapshot van iedere Virtuele Machine:

Get-VM | New-Snapshot - Name "New Snapshot"

Zoek naar alle snapshots ouder dan twee maanden:

Get-VM|Get-Snapshot|Where{\$_ .Created -lt (Get-Date).addMonths(-2)}

Hoe verwijder ik alle Snapshots:

Get-Vm | Get-Snapshot | Remove-Snapshot



Alle error meldingen van de laatste 24 uur.

```
Get-VIEvent -Start (Get-Date).AddHours(-24) -Type  
Error | Format-Table CreatedTime,  
FullFormattedMessage -AutoSize
```

De twintig volumes met de minst vrije schijf ruimte.

```
Get-VM | Where { $_.PowerState -eq "PoweredOn" } |  
Get-VMGuest | Select VmName -ExpandProperty Disks |  
Select VmName, Path,  
{N="MBFree";E={[math]::Round((($_.FreeSpace)/1MB),2  
)}} | Sort MBFree | Select -First 20 | Format-Table -  
AutoSize | Out-Printer
```



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VI Toolkit Extensions

Function	Cmdlet Names
Stopping, Starting and Restarting ESX Hosts	Stop-TkeVMHost, Start-TkeVMHost, Restart-TkeVMhost
Viewing and Changing VMX Files	Get-TkeVmx, Set-TkeVmx
Copy Files To and From Datastores (with lots of help from Stephen Campbell)	Copy-TkeDatastoreFile
Backing up VMs with VCB (courtesy of Justin Grote)	Backup-TkeVM
Moving VMs with Storage VMotion	SVmotion-TkeVM
Registering VMs	Register-TkeVM
Finding Orphaned VMDK Files (courtesy of HJA van Bokhoven)	Get-TkeOrphanedVmdk
Listing Files Inside Datastores	Get-TkeDatastoreFile

VI Toolkit for Windows Community Extensions

<http://www.codeplex.com/vitoolkitextensions>

Het toevoegen van de VI Toolkit Extensions

Add-Module "C:\Temp\viToolkitExtensions.psm1"



Get-TkeOrphanedVmdk

The screenshot shows the PowerGUI Script Editor window. The script editor contains the following PowerShell code:

```
1 Add-Module "C:\Temp\viToolkitExtensions.psml"  
2 Get-PSSnapin -registered | Add-PSSnapin -passthru -ErrorAction SilentlyContinue  
3 $Server = Connect-VIServer -Server 192.168.75.128 -User root -Password vmware  
4 get-TkeOrphanedVmdk  
5  
6
```

The Locals pane shows the following variables:

Variable	Value
\$Server	192.168.75.128
IsConnected	True
Name	192.168.75.128
Port	443
SessionId	52bc379a-013d-9ff7-a48c-
Length	36
User	root

The Output pane shows the following results:

```
OrphanedVMDK  
-----  
[Storage1] esxconsole-48da4089-a257-306c-cbec-  
000c29b6a530esx...  
[Storage1] New Virtual MachineNew Virtual Machine.vmdk  
C:\Program Files\PowerGUI>
```

Script execution completed.

Ln 4 | Col 1 | Ch 1 www.powergui.org



Get-TkeSnapshotExtended

Get-VM | Get-TkeSnapshotExtended | Select Name, VM, SizeMB

Graphical Windows PowerShell

File Edit View Runspace Help

Script Editor

```
Name : clone-temp-1226239842569875
VM : VC
SizeMB : 33,0183258056641
```

PS C:\Users\Eric Sloof>

```
Add-Module "C:\Temp\viToolkitExtensions.psm1"
Get-PSSnapin -registered | Add-PSSnapin -passthru -ErrorAction SilentlyContinue
$Server = Connect-VIServer -Server 192.168.178.103 -User Administrator -Password
Get-VM | Get-TkeSnapshotExtended | Select Name, VM, SizeMB
```

Completed 14



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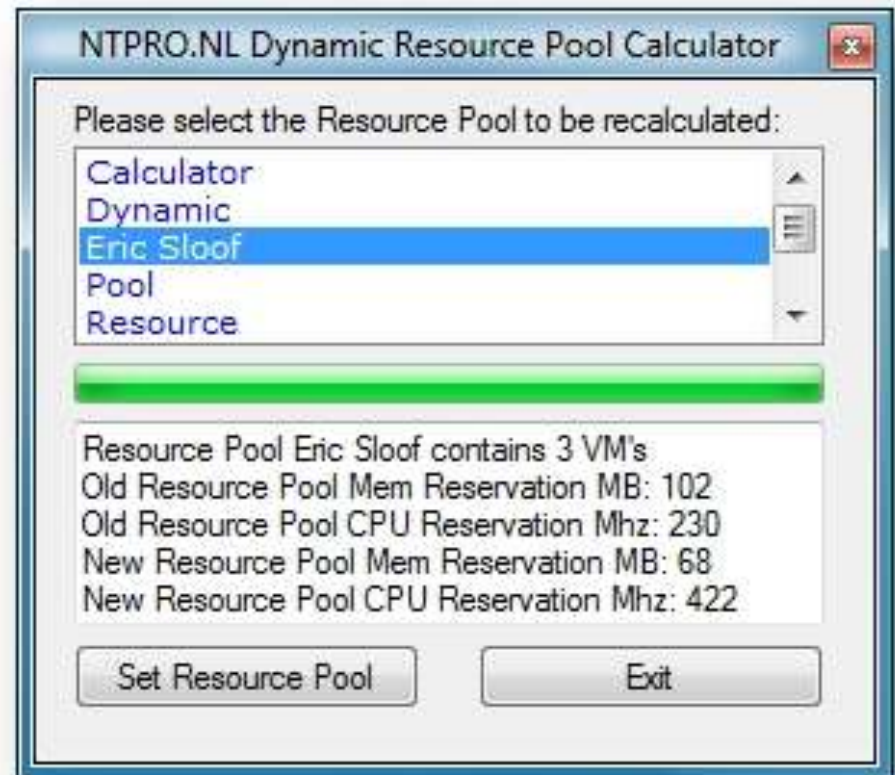
Op internet zijn er talrijke kant en klare scripts te vinden.

- Resource Pool Calculator**
- Guest Provisioning System**
- HBA Loadbalance script**



Dynamic Resource Pool Calculator

De Resource Pool Calculator berekent de reservering op basis van het aantal virtuele machines binnen de pool en respecteert de bestaande reserveringen.





Guest Provisioning System

Luc Dekens heeft een script geschreven waarmee een groot aantal virtuele machines gecreëerd kan worden. Tevens is dit het winnende script in de PowerShell contest.

The screenshot displays the 'Guest Provisioning System' application window. It features a menu bar with 'File', 'Tools', and 'Help'. The main interface is divided into several sections:

- Virtual Center:** A text field for 'Virtual Center' containing '10.21.10.80' and a 'Refresh' button.
- VI Options:** Fields for 'VMhost' (10.16.83.241), 'Folder' (Datacenters), 'Datastore' (200GB_Shared), and 'Resource pool' (Host Pool).
- Guest Options:** Fields for 'Template' (VC VM), 'Memory' (512mb), 'vCPU' (1), 'Boot delay (ms)', 'BIOS setup' (unchecked), and 'Poweron' (checked).
- Network(s):** A list box containing 'Demo Network' with 'Delete' and 'Add' buttons below it.
- Disk(s):** A list box containing '4 Gb' with 'Delete' and 'Add' buttons below it.
- OS Options:** Fields for 'Computename' (VC 6), 'IP address' (10.24.1.10), 'Subnetmask' (255.0.0.0), 'Gateway' (10.24.1.254), 'DNS server', 'Fullname' (The 6th VC done), and 'Organisation'. It also includes fields for 'OS Key', 'Local admin pswd', and 'Timezone'.
- Join Domain:** Fields for 'Domain', 'Account', and 'Password'.
- Guest(s):** A list box on the right containing 'VC 1', 'VC 2', 'VC 3', 'VC 4', and 'VC 5', with 'Add', 'Delete', 'Clear', and 'Execute' buttons below it.



Rob Mokkink heeft een script gemaakt waarmee je de lun paden op alle ESX servers op een gemakkelijke manier kunt verdelen.

Het script zet de Path Management Policy op fixed. Alle oneven luns worden op preferred path vmhba1 gezet. Alle even luns worden op preferred path vmhba2 gezet.

```
State           : Connected
CustomFields    : {}
Id              : HostSystem-host-946
Name            : oxaesxe004.pc.olow2k3.n1

CONNECTED TO HOST: oxaesxe004.pc.olow2k3.n1 [OK]
LUN: vmhba1:0:4 - EVEN LUN NUMBER
NEW PATH FOR LUN: vmhba1:0:4 IS: vmhba2:0:4 [OK]
LUN: vmhba1:0:0 - EVEN LUN NUMBER
NEW PATH FOR LUN: vmhba1:0:0 IS: vmhba2:0:0 [OK]
LUN: vmhba1:0:2 - EVEN LUN NUMBER
NEW PATH FOR LUN: vmhba1:0:2 IS: vmhba2:0:2 [OK]
LUN: vmhba1:0:3 - ODD LUN NUMBER
NEW PATH FOR LUN: vmhba1:0:3 IS: vmhba1:0:3 [OK]
LUN: vmhba1:0:1 - ODD LUN NUMBER
NEW PATH FOR LUN: vmhba1:0:1 IS: vmhba1:0:1 [OK]
```

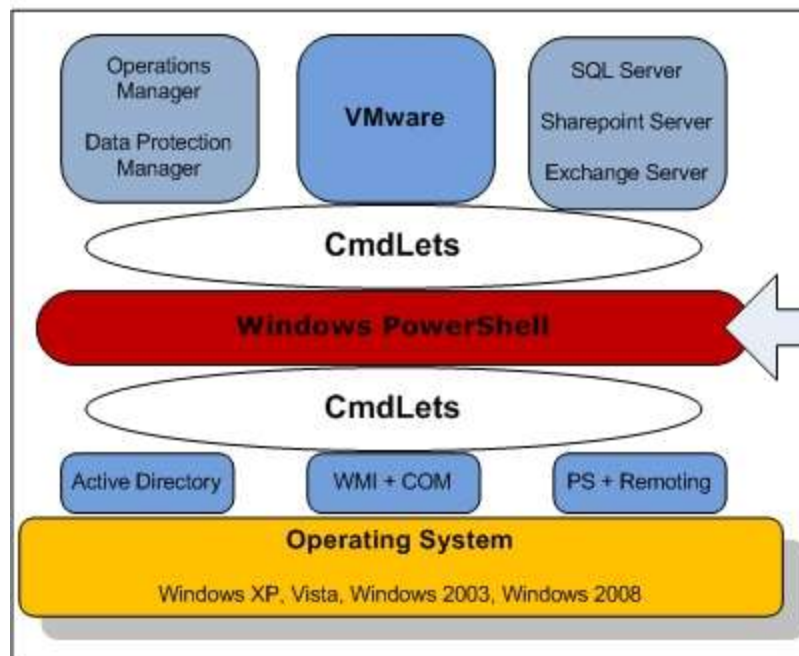


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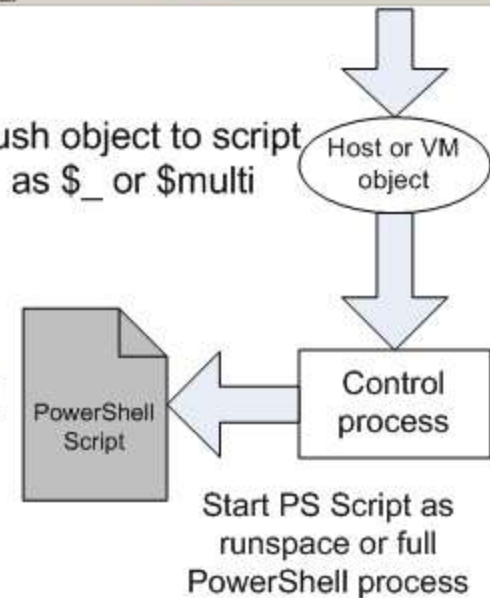


Integratie in de Infrastructure Client icomasoft VI PowerScripter Professional

VMware VI
Client
connection



Push object to script
as \$_ or \$multi





PowerScripter Hosts ESX context menu

The screenshot shows the VMware Infrastructure Client interface. The main window title is "vc01 - VMware Infrastructure Client". The menu bar includes File, Edit, View, Inventory, Administration, Plugins, and Help. The toolbar contains icons for Inventory, Scheduled Tasks, Events, Administration, Maps, Consolidation, and PowerScripter. The left pane shows the "Hosts & Clusters" view with a context menu open. The context menu items are:

- New Folder (Ctrl+F)
- New Cluster... (Ctrl+L)
- Add Host... (Ctrl+H)
- Add Alarm...
- Add Permission...
- Remove
- Rename
- PowerScripter Hosts** (highlighted)
- PowerScripter VMs
- PowerScripter Edit script
- PowerScripter Schedule script

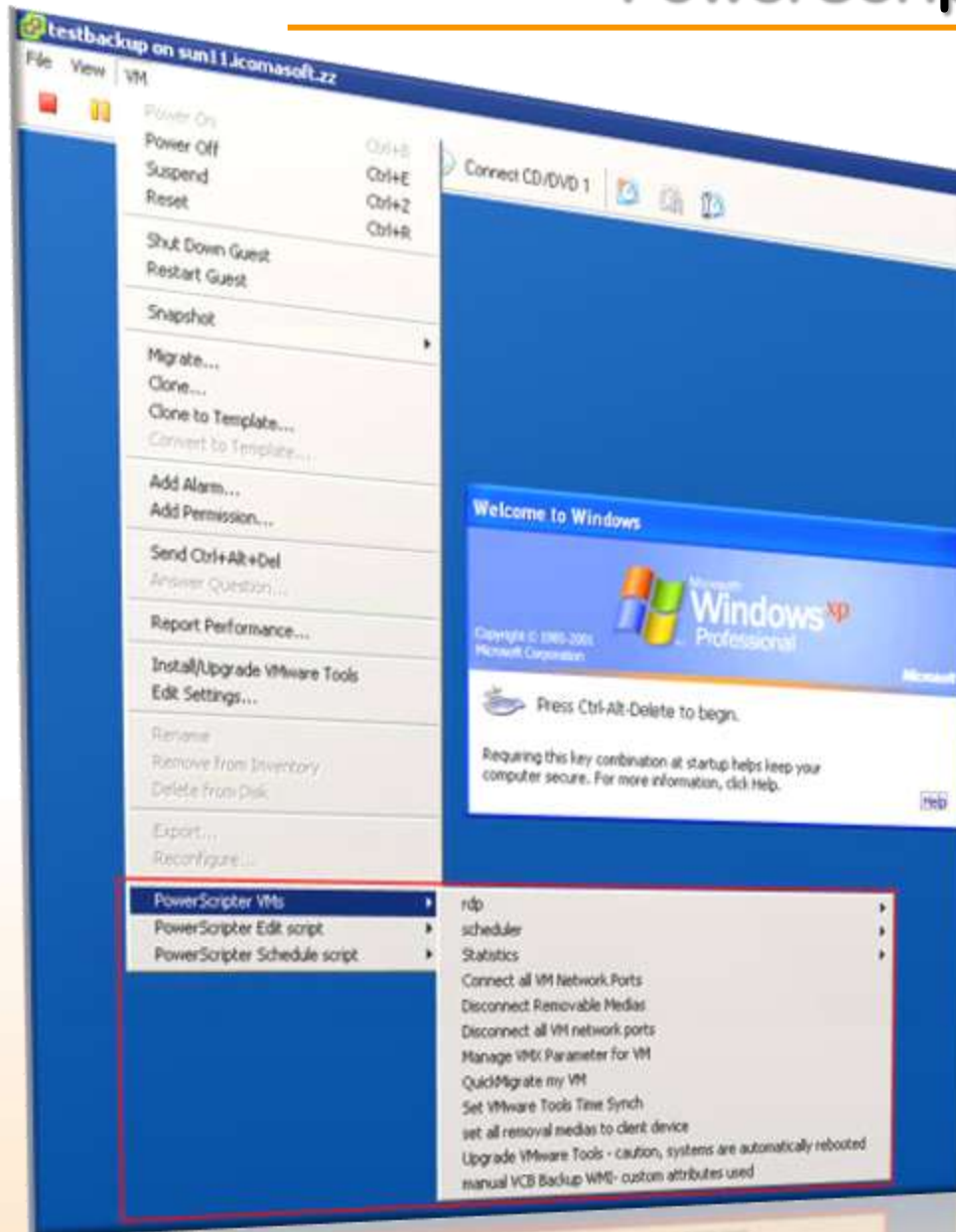
The "PowerScripter Hosts" sub-menu is expanded, showing the following options:

- scheduler
- SSH
- Statistics
- Set Host root password
- create Portgroup and-or vSwitch
- Delete Portgroup on Hosts
- Mass Deploy VMs with same base name
- Rescan SAN
- Restart VirtualCenter ESX Host Agent - run on direct ESX connection only
- Restart VirtualCenter ESX Host Agent - VirtualCenter connection
- Search VMware ESX Log - case sensitive
- View VMware ESX Log files
- SSH

The background shows a table with columns for Hosts, Virtual Machines, Alarms, Permissions, and Maps. The "Hosts" column shows a value of 4, and the "Virtual Machines" column shows a value of 39.



PowerScripter VMs context menu



- Protocol analysis ESX Host
- Setting ESX Host root passwords
- Management of virtual switches
- Rescan All HBAs Host or Cluster
- Update VMware tools
- Config-Export of VM
- Mass provisioning of VMs
- Disconnecting all drives
- Client device properties of all drives
- Evacuate Host for maintenance
- Quick migration
- TOP10 usage analysis
- Storage and snapshot statistics



PowerScripter Schedule Script

Schedule Script

Selected Inventory Items:

Task Name:

Task Description:

Frequency:

Start Time:

Interval: Run every day(s).

Script:

```
add-psnapin vmware* -ErrorAction SilentlyContinue;
$psconnection = Connect-VIServer -server "%host%" -session %session% > $null;
#-name Rescan SAN
#-hideoutput
#-origin icomasoft

Get-VMhost | get-VMHostStorage -RescanAllHBA
Get-VMhost | get-VMHostStorage -Refresh
```



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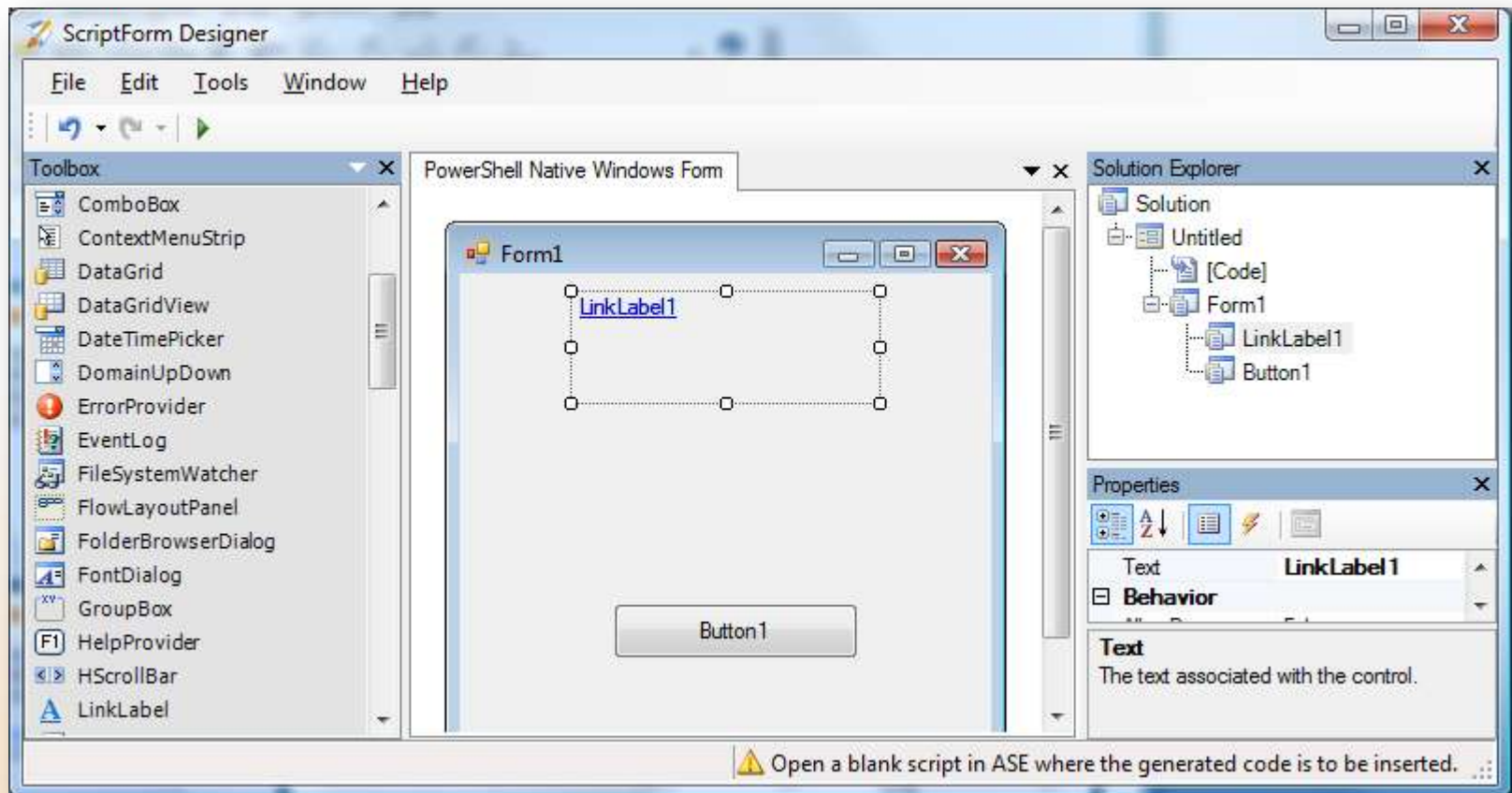


Er is aardig wat software beschikbaar waarmee het werken met PowerShell nog leuker wordt.

- **AdminScriptEditor**
- **PrimalForms**
- **PowerGUI**
- **PowerShellPlus**
- **PowerGadgets**



De AdminScriptEditor heeft een Active Debugger, (executable) Deployer en een Scriptform Designer.





Met PrimalForms kun je gratis een UI aanmaken.

The screenshot displays the PrimalForms application window titled "PrimalForms - Untitled". The interface includes a ribbon-style toolbar with sections for "File" (New, Save, Save As), "Export" (Export Powershell), and "Edit" (SelectAll, Delete, and various editing icons). On the left, a "Windows Forms" palette lists various controls such as Button, CheckBox, ComboBox, and Label. The central design canvas shows a form titled "Primal Form" containing a date picker control displaying "dinsdag", a label "label1", and a button "button1". On the right, a properties panel is visible, showing a table of properties for the selected control.

ShowCheckBox	False
ShowUpDown	False
UseWaitCursor	False
Behavior	
AllowDrop	False
Checked	True
ContextMenuStrip	(none)
CustomFormat	
Enabled	True
ImeMode	NoControl
MaxDate	31-12-9998
MinDate	1-1-1753
TabIndex	2
TabStop	True
Value	4-11-2008 21:31

Value
The current date/time value for this control.



Met PowerGUI kun je zonder typen een script aanmaken, daarnaast zit er een handige Editor in.

The screenshot shows the PowerGUI application window. The menu bar includes File, Tools, Options, and Help. The left pane shows a tree view of the system hierarchy, with 'Virtual Machines' expanded to show 'Snapshots older than 7 days'. The main pane displays a table of snapshots:

Name	Description	PowerState
test	test	PoweredOff

The right-hand panel contains sections for 'Links', 'Actions', and 'Actions: Common', each with a list of available actions and an 'Add new item...' button. At the bottom, there are tabs for 'UI' and 'PowerShell Code'. The status bar at the bottom left indicates '1 objects'.



In deze Editor kun je met behulp van een Explorer door je variabelen heen wandelen.

The screenshot shows the PowerGUI Script Editor interface. The main window contains a PowerShell script with the following content:

```
1 Get-PSSnapin -registered | Add-PSSnapin -passthru -ErrorAction SilentlyContinue
2 [void] [System.Reflection.Assembly]::LoadWithPartialName ("System.Windows.Forms")
3 [void] [System.Reflection.Assembly]::LoadWithPartialName ("System.Drawing")
4 $Voice = New-Object -com SAPI.SpVoice
5 $Server = Connect-VIServer -Server 192.168.75.128 -User root -Password vmware
6 $MyVMS = Get-VM
```

The interface is divided into several panes:

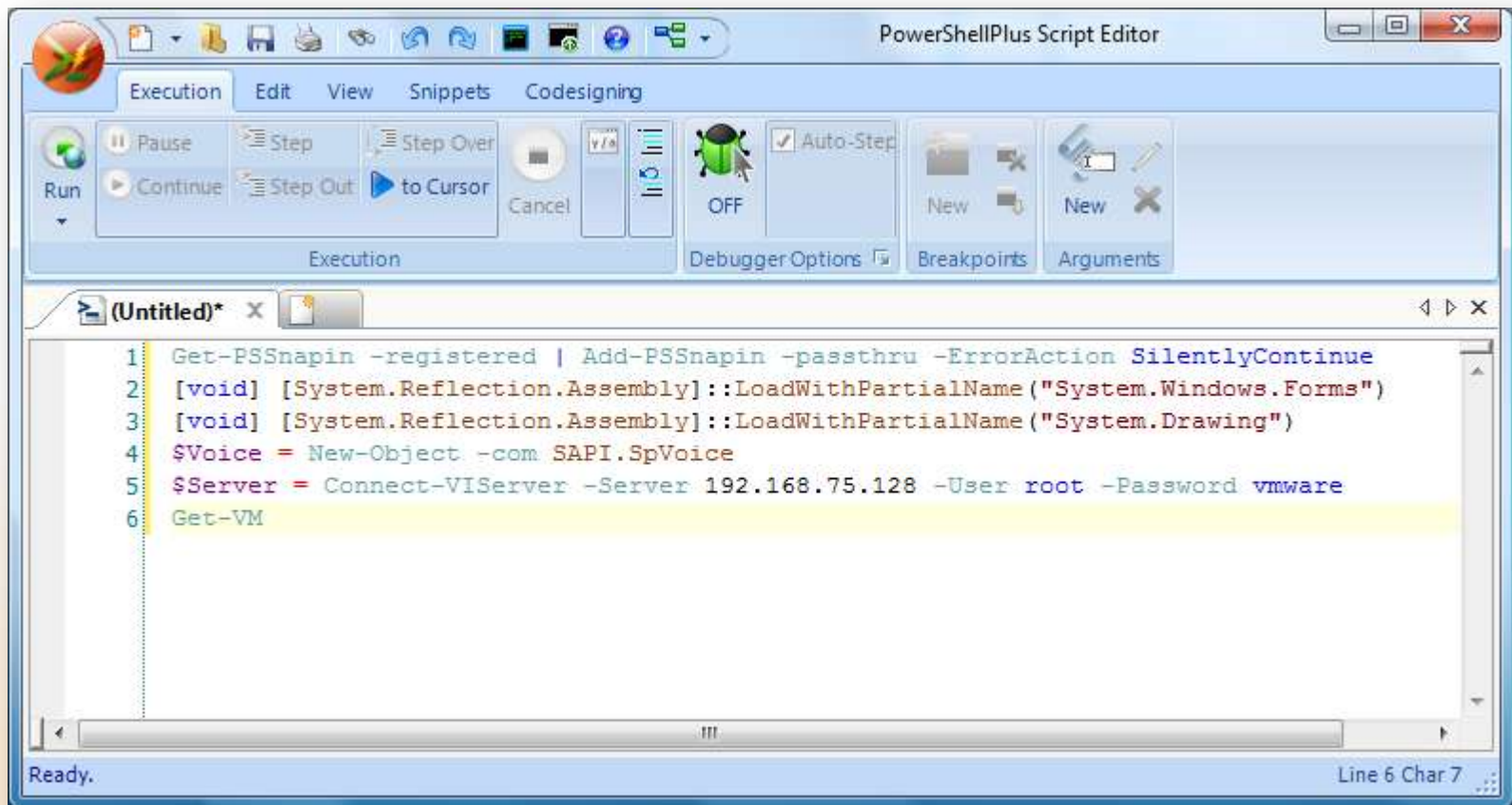
- Locals:** A tree view showing the state of variables. The expanded view shows:

\$Server	192.168.75.128
\$MyVMS	New Virtual Machine Nostalgia Eric
Length	3
LongLength	3
Rank	1
SyncRoot	Quest.PowerGUI.ScriptEditor.Shared.MonadObjectC
[0]	New Virtual Machine
PowerState	PoweredOff
Description	
Guest	VMware.VimAutomation.Client20.VMGuestImpl
NumCpu	1
MemoryMB	256
CDDrives	Quest.PowerGUI.ScriptEditor.Shared.MonadObjectC
[0]	CD/DVD Drive 1
- Output:** A table showing the output of the script execution:

Name	PowerState	Num	CPUs
New Virtual Machine	PoweredOff	1	256
Nostalgia	PoweredOff	1	64
Eric	PoweredOff	1	4
- Bottom Status Bar:** Displays "Script execution completed." and "Ln 6 | Col 10 | Ch 10 www.powergui.org".



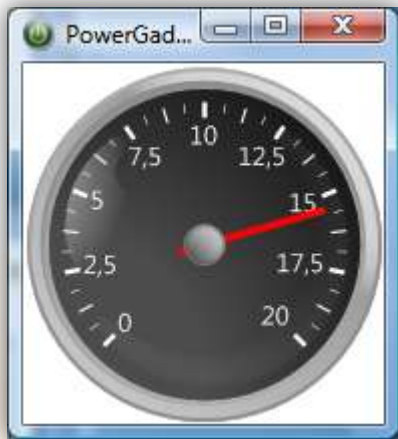
Met PowerShellPlus kun je realtime debuggen.



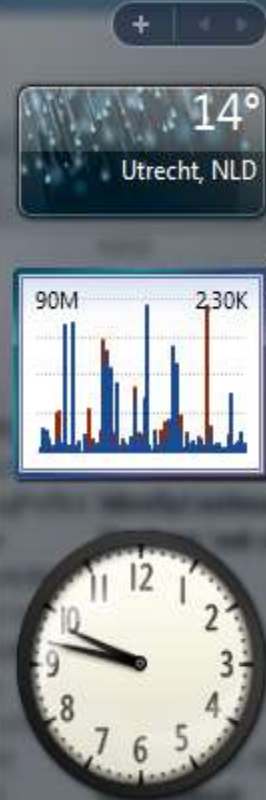


Met PowerGadgets kun je grafieken en sidebar gadgets presenteren.

**Get-Stat -Entity (Get-VMHost) -CPU –
Realtime | Out-Gauge**



**Get-process | out-chart –sidebar gadget1 –
refresh 0:0:5**

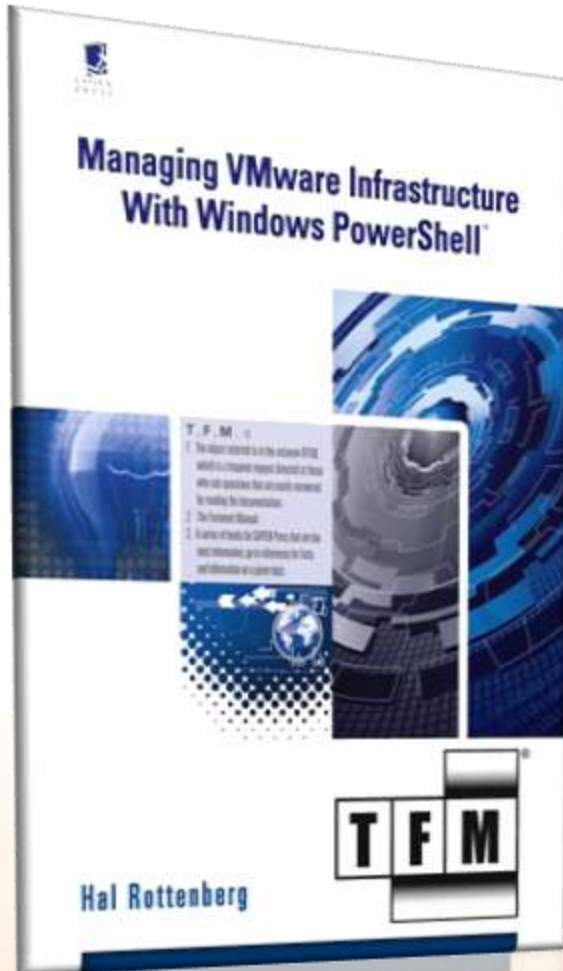




- PowerShell introductie
- VMware Cmdlets
- VI Toolkit Extensions
- Voorbeelden
- Integratie in de Infrastructure Client
- Diverse PowerShell tools
- **Links**



Vmware PowerShell boek



In februari 2009 zal het eerste Vmware PowerShell boek worden uitgebracht.

Hal Rottenberg | TechProsaic

<http://halr9000.com/>

Jonathan Walz & Hal Rottenberg
PowerScripting Podcast

<http://powerscripting.wordpress.com/>



Carter Shanklin

<http://blogs.vmware.com/vipowershell/>

VMware VI Toolkit (for Windows)

<http://vmware.com/go/powershell>

Microsoft Windows PowerShell

<http://www.powershellcommunity.org/>

PowerShell OneLiners

<http://www.peetersonline.nl>

VMware VI Toolkit (for Windows) Community

[http://communities.vmware.com/community/developer/
windows_toolkit](http://communities.vmware.com/community/developer/windows_toolkit)



**Deze presentatie is over 15 minuten beschikbaar op :
<http://ntpro.nl>**

**In de workshop kun je zelf aan de slag met PowerShell.
Leer hoe deze technologie jou kan helpen in het beheer
van een VMware omgeving!**

**De workshop wordt mogelijk gemaakt door
Xpert Training Group i.s.m. DELL.**