Managing Large Scale vSphere Environments with PowerCLI

Andrey Anastasov, PowerCLI Architect

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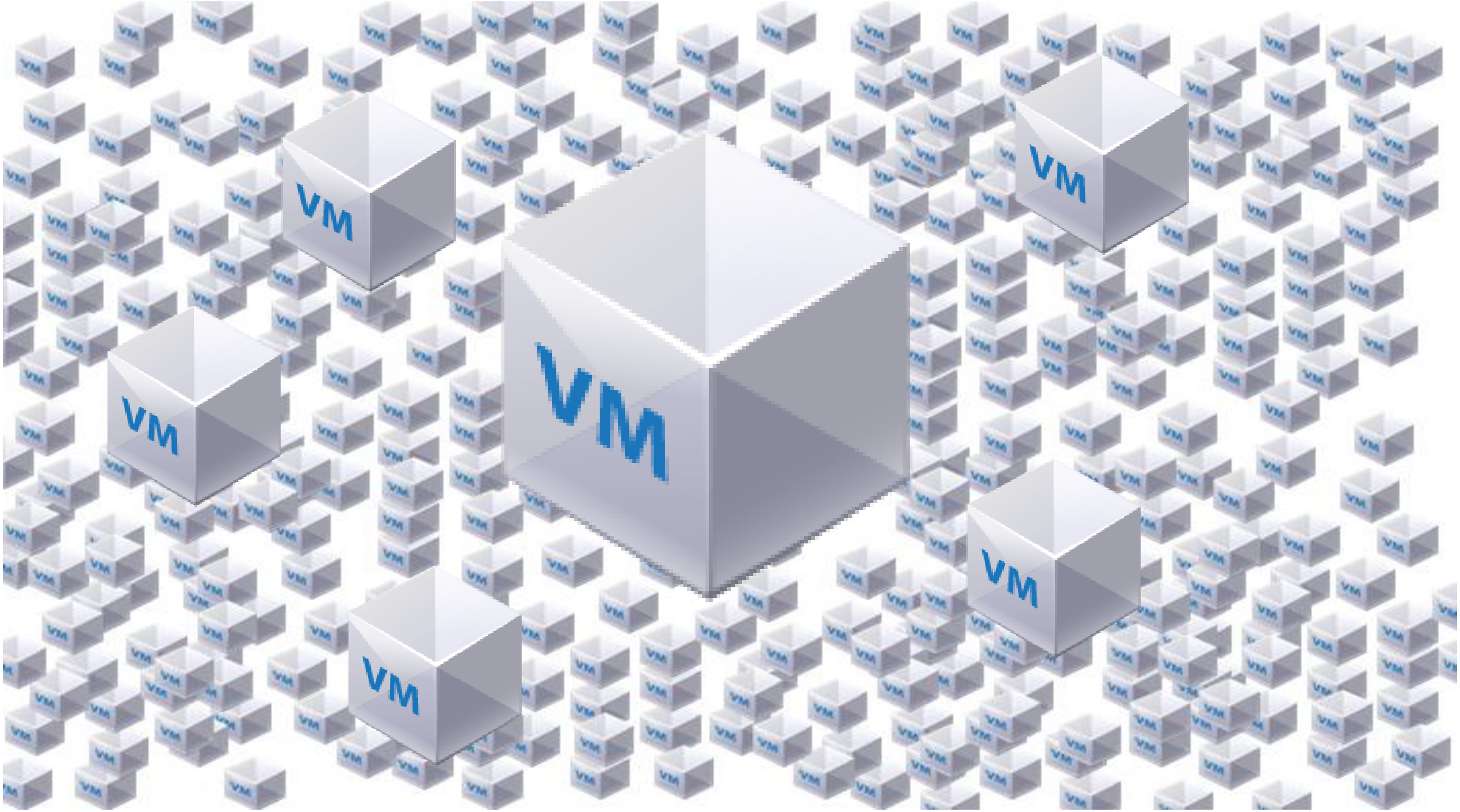
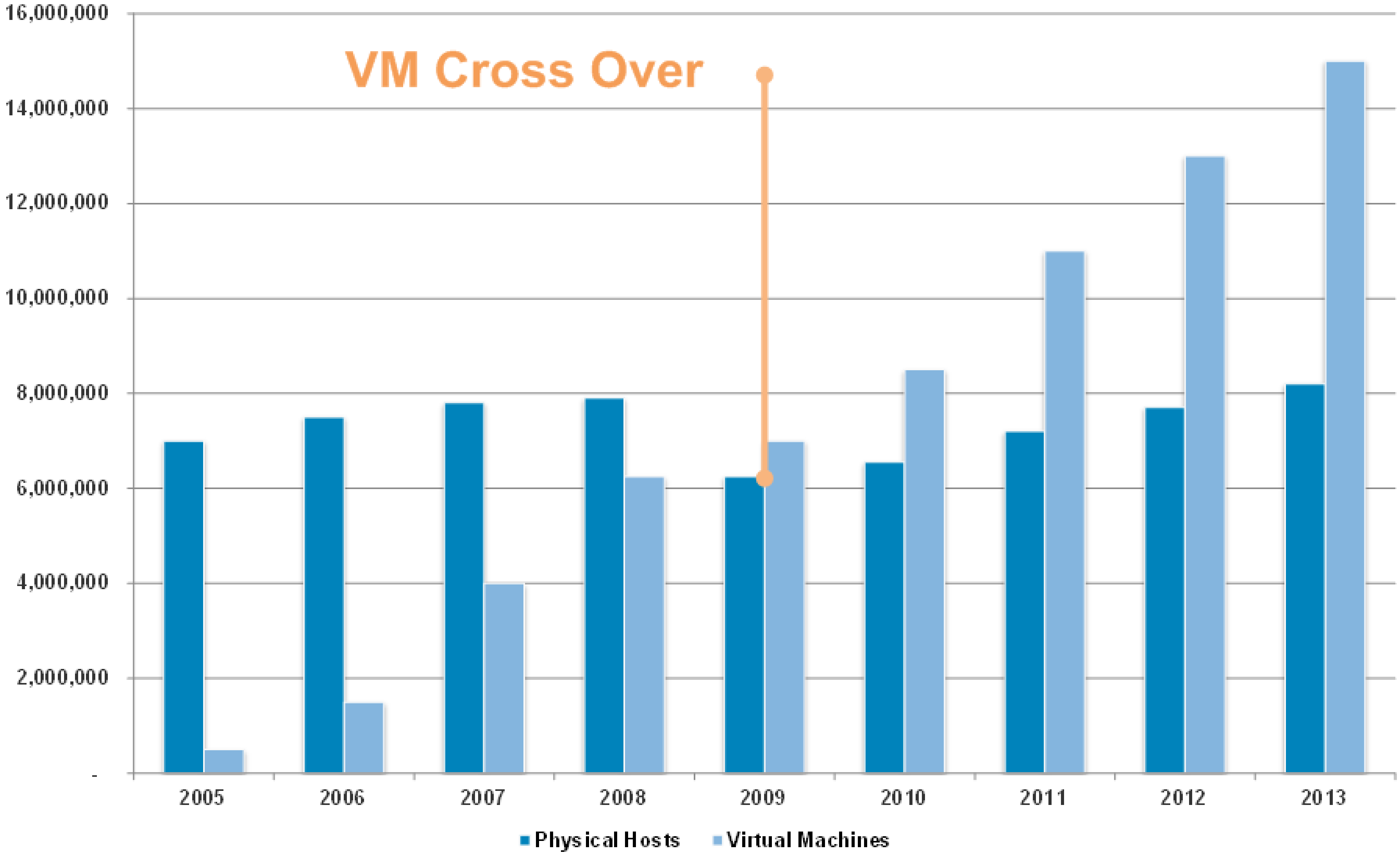
VMware vSphere™ PowerCLI



VMware vSphere™ PowerCLI



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Agenda

- **VMware vSphere™ PowerCLI**
- **Common use cases and latest features**
- **Tips and tricks**
- **PowerCLI ecosystem and opportunities**
- **Q&A**

VMware vSphere™ PowerCLI

Windows PowerShell interface for managing vSphere™

VMware vSphere™ PowerCLI

PowerCLI lets you make large scale changes in a consistent and auditable way.

PowerCLI can automate anything you care about in your virtual environment.

PowerCLI will help you identify problems before they become crises.

PowerCLI will save you a ton of time.

1-2-3

PowerCLI is the easiest way to automate.

Microsoft® PowerShell™ - Overview

- **Microsoft PowerShell is the foundation of PowerCLI**
- **The best shell today**
  - Easy to learn and understand
  - Built for system administrators, not for programmers
  - Commands use objects: No need to parse
  - Entire .NET library at hand
- **Microsoft is serious about it**

Microsoft PowerShell – A Taste Of

```
Get-VM
```

Microsoft PowerShell – A Taste Of

```
Get-VM -Name "Web*"
```

Microsoft PowerShell – A Taste Of

```
$ds = Get-Datastore -Name "San01"
```

Microsoft PowerShell – A Taste Of

```
Get-VM -Datastore $ds | Start-VM
```

Common use cases and latest features

The art of being efficient

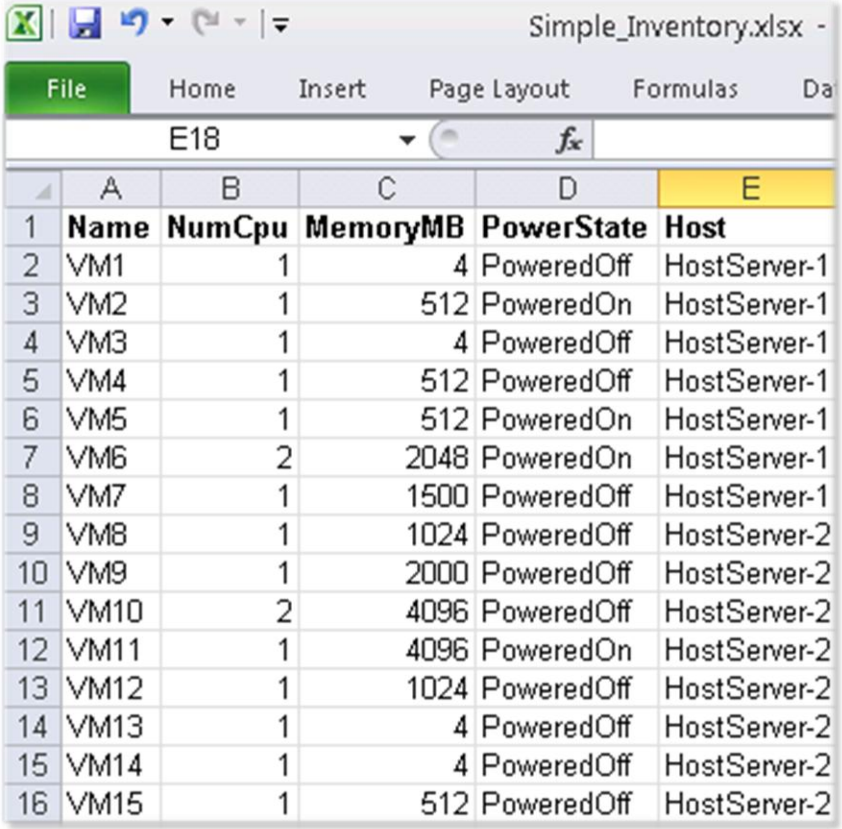
Common use cases

- **Reporting**
  - Reviewing my VMs
  - Basic Capacity Information
  - vCheck by Alan Renouf

Reviewing My VMs

```
# Retrieve current inventory of VMs with a particular
properties that are of interest

Get-VM | Select-Object Name, NumCPU, MemoryMB, PowerState,
Host | Export-CSV Simple_Inventory.csv -NoTypeInformation
```



	A	B	C	D	E
1	**Name**	**NumCpu**	**MemoryMB**	**PowerState**	**Host**
2	VM1	1	4	PoweredOff	HostServer-1
3	VM2	1	512	PoweredOn	HostServer-1
4	VM3	1	4	PoweredOff	HostServer-1
5	VM4	1	512	PoweredOff	HostServer-1
6	VM5	1	512	PoweredOn	HostServer-1
7	VM6	2	2048	PoweredOn	HostServer-1
8	VM7	1	1500	PoweredOff	HostServer-1
9	VM8	1	1024	PoweredOff	HostServer-2
10	VM9	1	2000	PoweredOff	HostServer-2
11	VM10	2	4096	PoweredOff	HostServer-2
12	VM11	1	4096	PoweredOn	HostServer-2
13	VM12	1	1024	PoweredOff	HostServer-2
14	VM13	1	4	PoweredOff	HostServer-2
15	VM14	1	4	PoweredOff	HostServer-2
16	VM15	1	512	PoweredOff	HostServer-2

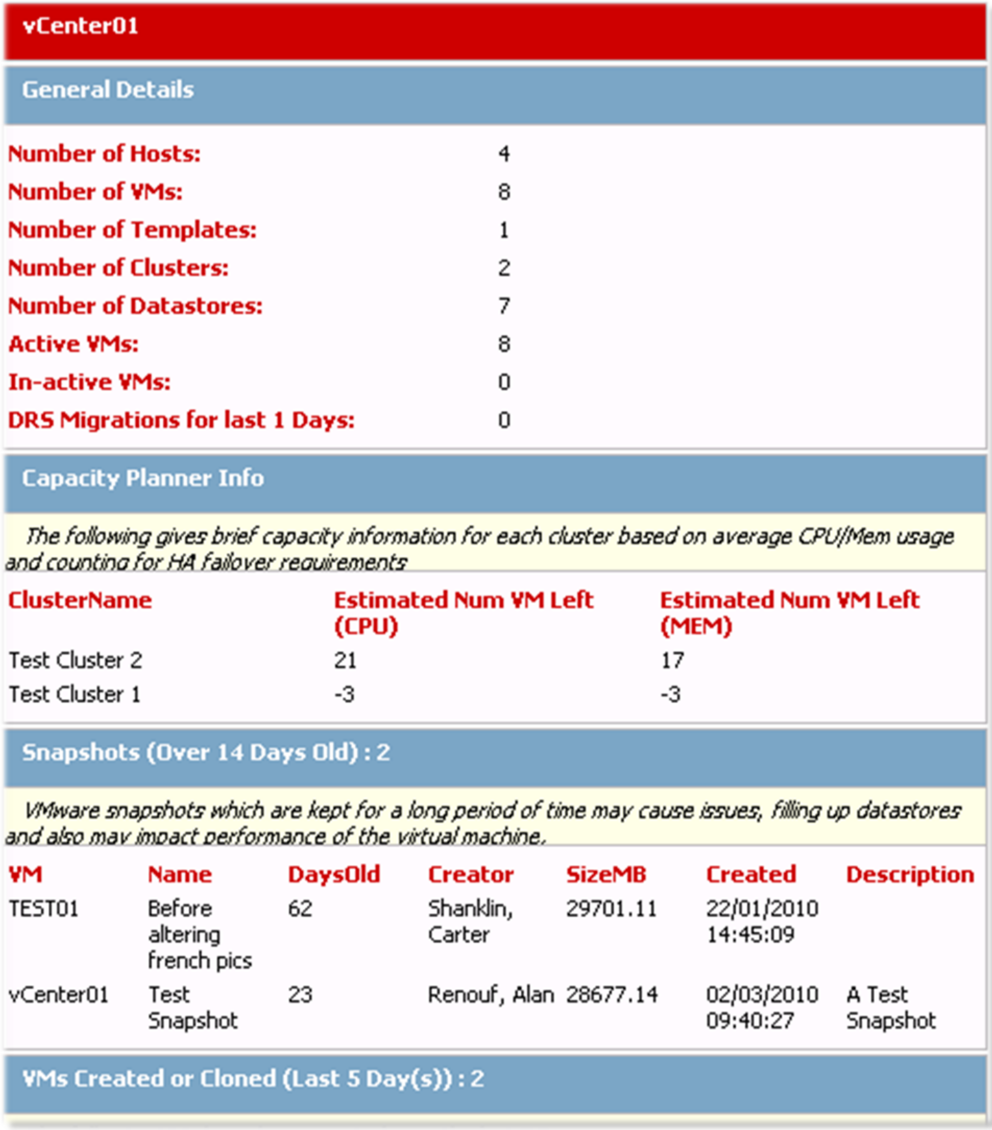
Basic Capacity Information

```
                  # Total number of hosts
$TotalVMHosts = (Get-VMHost).Count
Write-Host "There are $TotalVMHosts Hosts in
$DefaultVIServer“

                  # Total number of guests
$TotalVMs = (Get-VM).Count
Write-Host "There are $TotalVMs Virtual Machines in
$DefaultVIServer"
```

vCheck by Alan Renouf

- http://www.virtu-al.net/



vCenter01

General Details

Number of Hosts:	4
Number of VMs:	8
Number of Templates:	1
Number of Clusters:	2
Number of Datastores:	7
Active VMs:	8
In-active VMs:	0
DRS Migrations for last 1 Days:	0

Capacity Planner Info

The following gives brief capacity information for each cluster based on average CPU/Mem usage and counting for HA failover requirements

ClusterName	Estimated Num VM Left (CPU)	Estimated Num VM Left (MEM)
Test Cluster 2	21	17
Test Cluster 1	-3	-3

Snapshots (Over 14 Days Old) : 2

VMware snapshots which are kept for a long period of time may cause issues, filling up datastores and also may impact performance of the virtual machine.

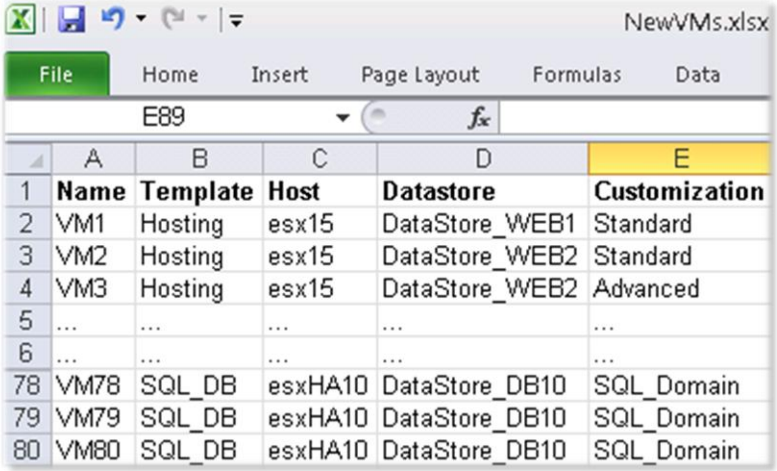
VM	Name	DaysOld	Creator	SizeMB	Created	Description
TEST01	Before altering french pics	62	Shanklin, Carter	29701.11	22/01/2010 14:45:09	
vCenter01	Test Snapshot	23	Renouf, Alan	28677.14	02/03/2010 09:40:27	A Test Snapshot

VMs Created or Cloned (Last 5 Day(s)) : 2

Common use cases

- **Useful one-liners/short scripts**
  - Deploying Virtual Machines from a Template
  - Storage vMotion

Deploying Virtual Machines from a Template



	A	B	C	D	E
1	**Name**	**Template**	**Host**	**Datastore**	**Customization**
2	VM1	Hosting	esx15	DataStore_WEB1	Standard
3	VM2	Hosting	esx15	DataStore_WEB2	Standard
4	VM3	Hosting	esx15	DataStore_WEB2	Advanced
5	...	...	...	...	...
6	...	...	...	...	...
78	VM78	SQL_DB	esxHA10	DataStore_DB10	SQL_Domain
79	VM79	SQL_DB	esxHA10	DataStore_DB10	SQL_Domain
80	VM80	SQL_DB	esxHA10	DataStore_DB10	SQL_Domain

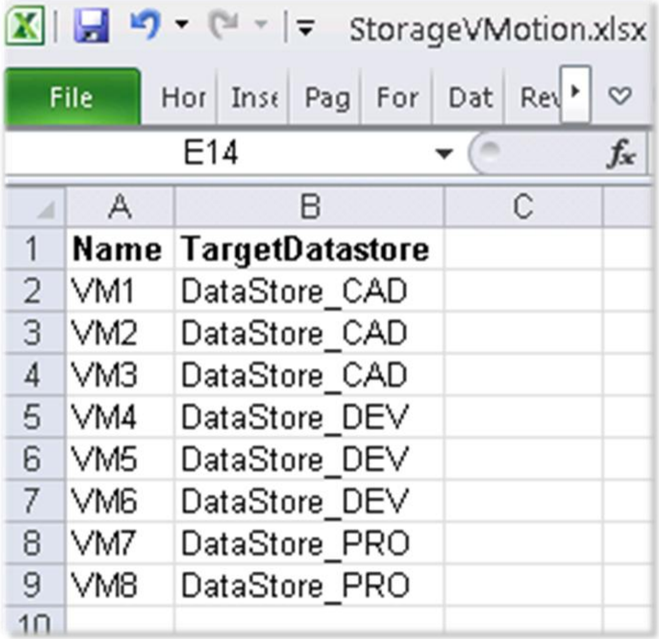
```
$vms = Import-CSV C:\NewVMs.csv

foreach ($vm in $vms){

  $Template = Get-Template $vm.Template
  $VMHost = Get-VMHost $vm.Host
  $Datastore = Get-Datastore $vm.Datastore
  $OSCustomization = Get-OSCustomizationSpec $vm.Customization

      New-VM -Name $vm.Name -Template $Template -VMHost
      $VMHost -Datastore $Datastore -OSCustomizationSpec
      $OSCustomization -RunAsync
}
```

Storage vMotion



	A	B	C
1	**Name**	**TargetDatastore**	
2	VM1	DataStore_CAD	
3	VM2	DataStore_CAD	
4	VM3	DataStore_CAD	
5	VM4	DataStore_DEV	
6	VM5	DataStore_DEV	
7	VM6	DataStore_DEV	
8	VM7	DataStore_PRO	
9	VM8	DataStore_PRO	
10			

```
$vms = Import-CSV C:\StorageVMotion.csv

foreach ($vm in $vms){
    Get-VM $vm.Name | Move-VM -Datastore $vm.TargetDatastore
}
```

Latest features 4.1.1

- EsxCLI
- EsxTop statistics through a Get-EsxTop cmdlet
- Enhanced vDS support
- Support for vCenter Server alarms
- Various host storage enhancements
- Encrypted credential store

Tips and Tricks

The art of being efficient

It’s a fact: PowerCLI does cover the entire vSphereAPI !

- **PowerCLI introduces over 250 cmdlets and 170 automation objects**
  - Designed to be fast and easy to use
  - vSphere API has close to 500 operations and over 2000 objects
- **.Net toolkit expose the entire vSphereAPI**
  - Client side .Net library distributed with PowerCLI
  - Could be used in .Net applications and Powershell scripts
  - Powershell interface – Get-View , Get-ViObjectByVIView cmdlets
- **Get started with .Net toolkit**

It’s a fact: PowerCLI does cover the entire vSphereAPI !

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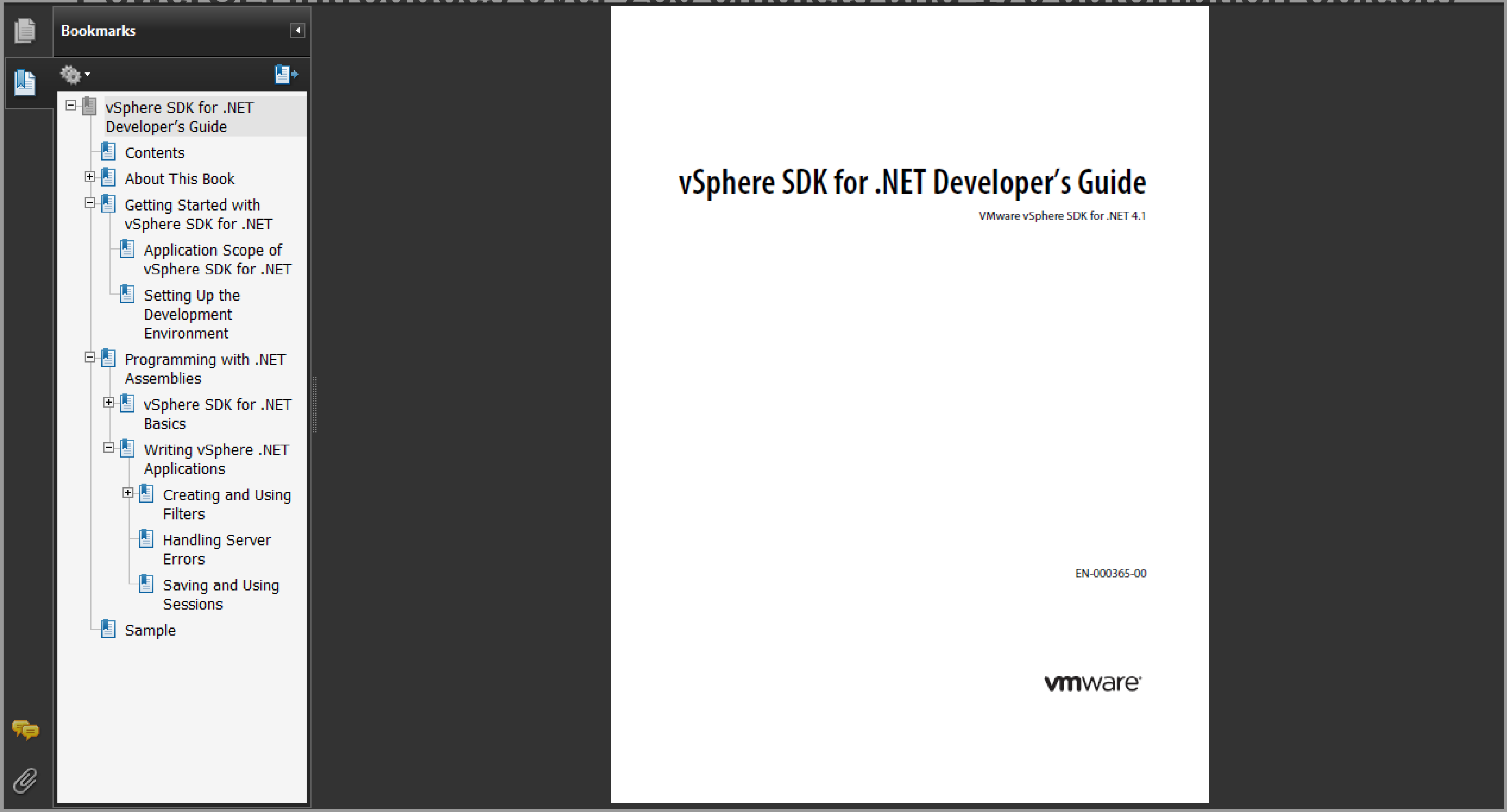


Bookmarks

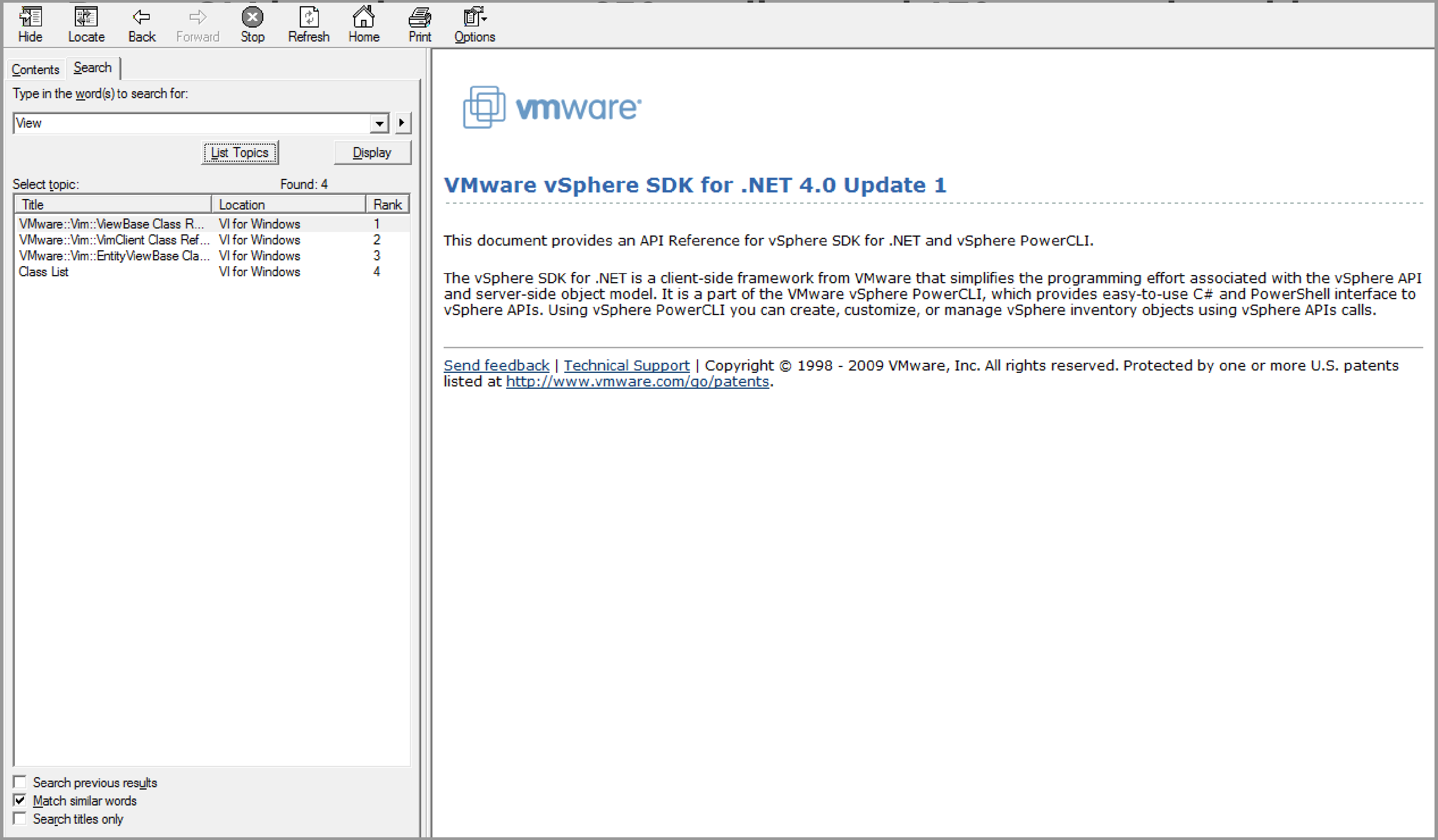
- vSphere SDK for .NET Developer’s Guide
  - Contents
  - About This Book
  - Getting Started with vSphere SDK for .NET
    - Application Scope of vSphere SDK for .NET
    - Setting Up the Development Environment
  - Programming with .NET Assemblies
    - vSphere SDK for .NET Basics
    - Writing vSphere .NET Applications
      - Creating and Using Filters
      - Handling Server Errors
      - Saving and Using Sessions
  - Sample

vSphere SDK for .NET Developer’s Guide

VMware vSphere SDK for .NET 4.1

EN-000365-00

It’s a fact: PowerCLI does cover the entire vSphereAPI !



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Title	Location	Rank
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VMware::Vim::VimClient Class Ref...	VI for Windows	2
VMware::Vim::EntityViewBase Cla...	VI for Windows	3
Class List	VI for Windows	4

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☑ Match similar words
☐ Search titles only

vmware

VMware vSphere SDK for .NET 4.0 Update 1

This document provides an API Reference for vSphere SDK for .NET and vSphere PowerCLI.

The vSphere SDK for .NET is a client-side framework from VMware that simplifies the programming effort associated with the vSphere API and server-side object model. It is a part of the VMware vSphere PowerCLI, which provides easy-to-use C# and PowerShell interface to vSphere APIs. Using vSphere PowerCLI you can create, customize, or manage vSphere inventory objects using vSphere APIs calls.

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It’s a fact: PowerCLI does cover the entire vSphereAPI !

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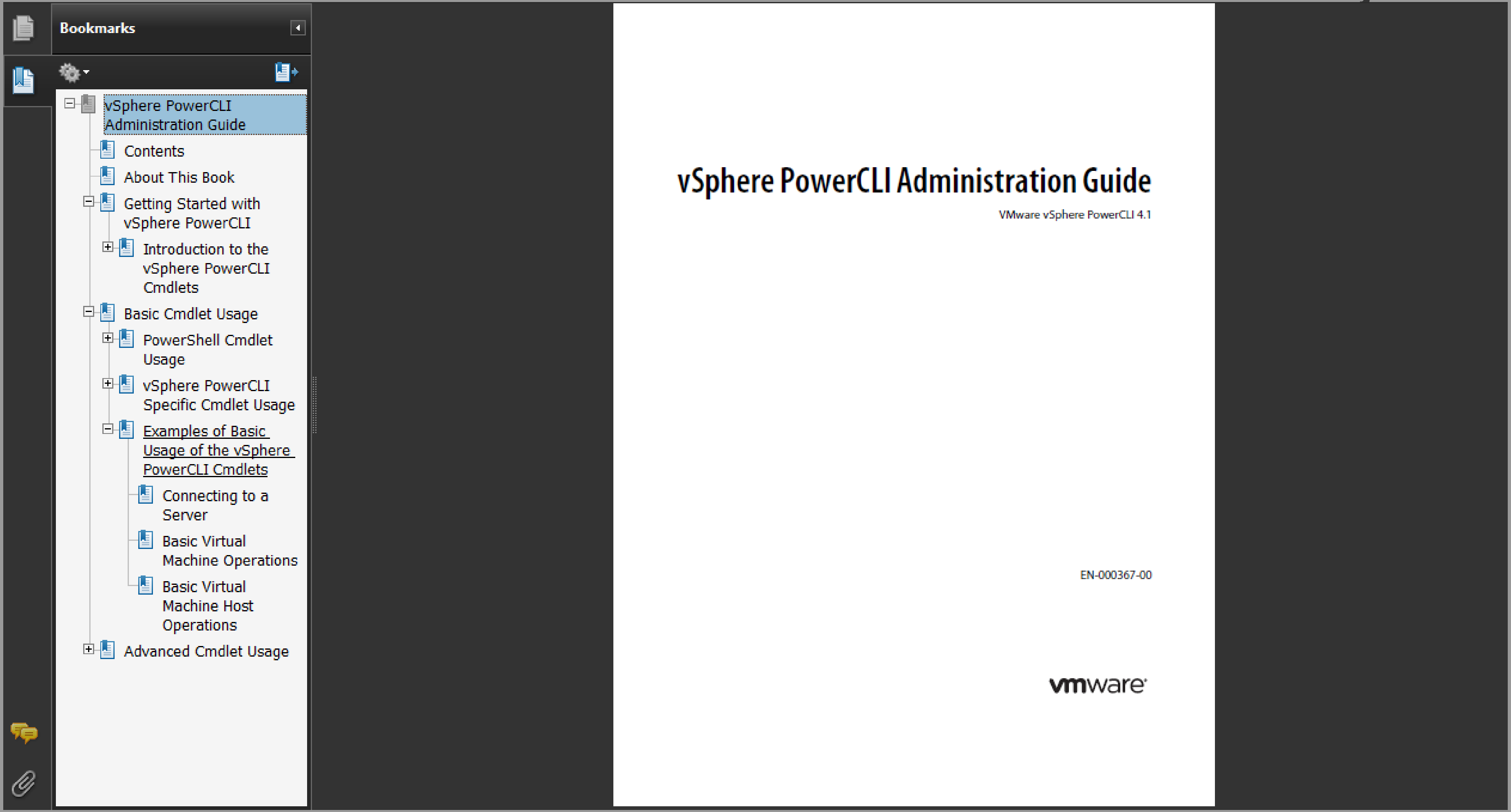


- vSphere PowerCLI Administration Guide
  - Contents
  - About This Book
  - Getting Started with vSphere PowerCLI
    - Introduction to the vSphere PowerCLI Cmdlets
  - Basic Cmdlet Usage
    - PowerShell Cmdlet Usage
    - vSphere PowerCLI Specific Cmdlet Usage
    - Examples of Basic Usage of the vSphere PowerCLI Cmdlets
      - Connecting to a Server
      - Basic Virtual Machine Operations
      - Basic Virtual Machine Host Operations
  - Advanced Cmdlet Usage

vSphere PowerCLI Administration Guide

VMware vSphere PowerCLI 4.1

EN-000367-00

vmware

Retrieving views in PowerCLI

- Get-View – the entry point to the .Net toolkit
- View – static copy of a serverside managed object

Retrieving views in PowerCLI – performance impact

```
# Retrieve views for several VMs filtered by PowerState
Get-VM | where {$_.PowerState -eq "PoweredOn"} | Get-View
```

VS

```
Get-View -ViewType "VirtualMachine" `
-Filter @{"Runtime.PowerState" = "PoweredOn"} √
```

Increase performance when retrieving view objects

```
# Interested only in few of the view properties?
Get-View -ViewType "VirtualMachine‟
```

VS

```
Get-View -ViewType "VirtualMachine" `
-Property “Name” , “Runtime.PowerState” √
```

Increase performance when retrieving view objects

```
# Interested onl                    view properties?

-Property "Name", "     ime.PowerState" √
```

WOW !

Specifying property parameter

is

~20 times faster on 100 vms

Find out what your PowerCLI code does

- “WhatIf” switch parameter

```
Remove-VM -VM “Web*"  -WhatIf


What if: Performing operation 'Removing VM from
inventory.' on VM ‘Web 64 bits‘


What if: Performing operation 'Removing VM from
inventory.' on VM ‘Web Hosting'
```

Increase your scripts performance by reducing OBN calls

- Object By Name selection (OBN)

```
Start-VM “MyVm"

Start-VM -VM (Get-VM -Name "MyVm")
```

Increase your scripts performance by reducing OBN calls

- **Object By Name selection (OBN)**

```
Start-VM "MyVm"
...
Update-Tools "MyVm"
...
New-Snapshot -Name "UpdatedTools" -VM "MyVm“
...
Stop-VM "MyVm"
```

Increase your scripts performance by reducing OBN calls

- **Object By Name selection (OBN)**

```
Start-VM -VM (Get-VM -Name "MyVm")
...
Update-Tools -VM (Get-VM -Name "MyVm")
...
New-Snapshot -Name "UpdatedTools" -VM (Get-VM -Name "MyVm")
...
Stop-VM (Get-VM -Name "MyVm")
```

Increase your scripts performance by reducing OBN calls

- Object By Name selection (OBN)

```
$MyVm = Get-VM -Name "MyVm"

Start-VM $MyVm

...

Update-Tools -VM $MyVm

...

New-Snapshot -Name "UpdatedTools" -VM $MyVm

...

Stop-VM $MyVm
```

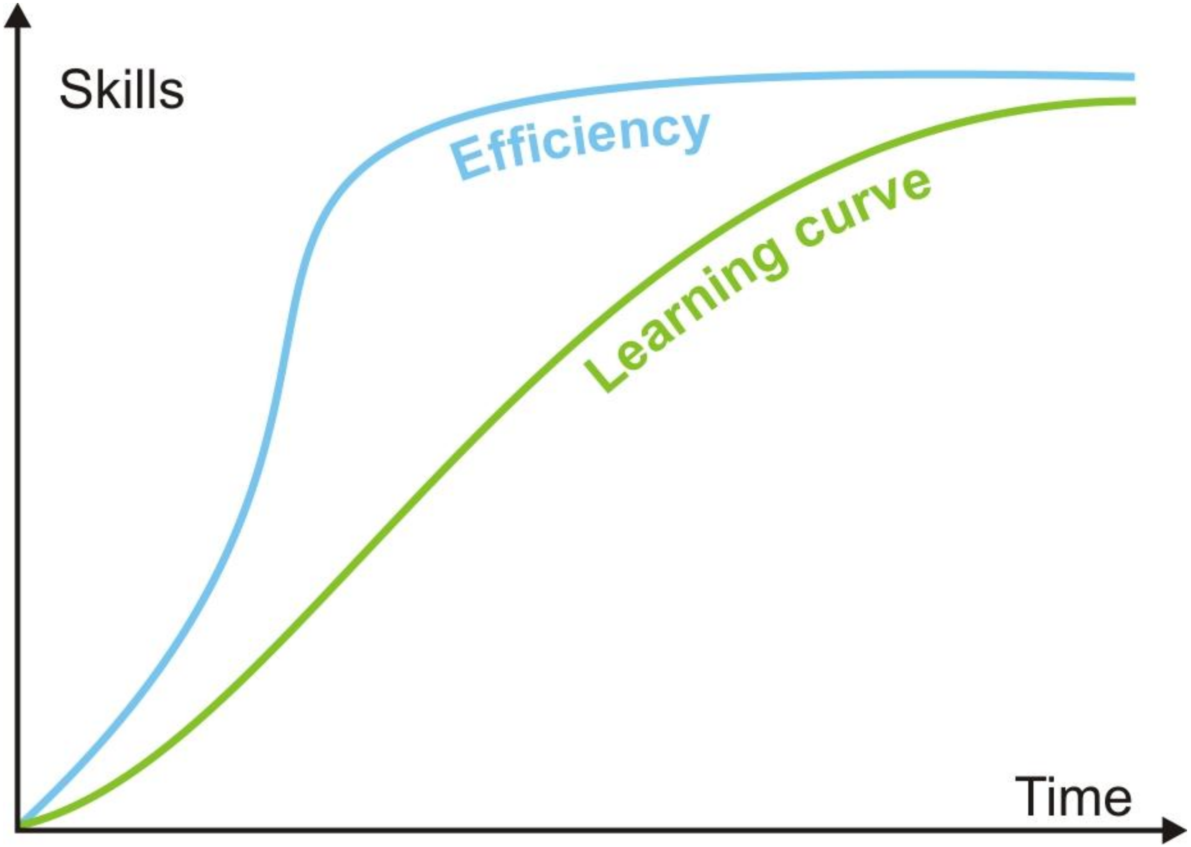
PowerCLI Ecosystem

Let's get the party started

VMware vSphere™ PowerCLI

- **Official community**
  http://vmware.com/go/powershell
  - Registered users - 1 701
  - Discussions - 3 097
  - Documents - 62
- **Official blog**
  http://blogs.vmware.com/vipowershell/
  - Blog posts - 151
  - Comments - 189
- **Extensions project**
  http://vitoolkitextensions.codeplex.com/
  - More than 100 functions
  - Page views - 118 577
  - Visits - 15 261
  - Downloads - 3 638

VMware vSphere™ PowerCLI Learning Curve vs. Efficiency



VMware vSphere™ PowerCLI

- Blog ecosystem
  - http://blogs.vmware.com/vipowershell
  - http://www.virtu-al.net/
  - http://www.lucd.info
  - http://www.van-lieshout.com/powercli
  - http://get-admin.com/blog
  - http://ict-freak.nl
  - http://www.ntpro.nl/blog
  - http://professionalvmware.com
  - http://www.van-lieshout.com/powercli
  - http://poshoholic.com

VMware vSphere™ PowerCLI

- **Software ecosystem**
  - PowerShell Plus - http://www.idera.com
  - PowerWF for VMware - http://powerwf.com
  - VI PowerScripter - http://www.icomasoft.com
  - PowerGUI - http://powergui.org

VMware vSphereTM PowerCLI

- Books

PRENTICE HALL
Managing VMware Infrastructure With Windows PowerShell
TFM
VI and
ere SDK
Managing the VMware
nfrastructure and vSphere
STEVE JIN
Sphere 4.0
Start Guide
wn the path of Virtualization
Bernie Baker
Thomas Bryant
Duncan Epping
Dave Mishchenko
Stuart Radnidge
Alan Renouf
Plan, design, and implement a virtual infrastructure
Automate tasks and procedures
Secure the virtualized environment
Sphere 4
mplementation
VMware vSphere PowerCLI Reference
Automating vSphere Administration
Luc Dekens, Alan Renouf, Glenn Sizemore, Arnim van Lieshout, and Jonathan Medd
Forewords by Dr. Stephen Alan Herrod and Jeffrey Snover
SYBEX SERIOUS SKILLS.

…and more coming

VMware vSphere™ PowerCLI

- **Large and Small customers around the world in different industry areas**
  - Finance
  - Retail
  - Government
  - Transportation
  - Health Care
  - Energy
  - Manufacturing
  - Education
- **Roadmap and solutions exposure**

Resources

Developer Support

- Dedicated support for your organization when building solutions using vSphere APIs, PowerCLI, vSphere Web Services SDKs and many more VMware SDKs
- http://vmware.com/go/sdksupport

PowerCLI Training

- 2 day instructor led training, 40% lecture, 60% lab
- http://vmware.com/go/vsphereautomation

VMware Developer Community

- SDK Downloads, Documentation, Sample Code, Forums, Blogs
- http://developer.vmware.com

Technology Alliance Partner (TAP) Program

- Updated partner benefits
- http://www.vmware.com/partners/alliances/programs/

Q&A

Now its your time