Hyper-V for VMware Administrators: A Crash Course

2014 Edition

➢ Mike Nelson. vExpert – CTP - MCSEPC

➢ Solutions Architect – nGenX

➢ @nelmedia

➢ mike.nelson@nGenx.com

CRASH

COURSES

Topics

◆**Questions**

◆**The History**
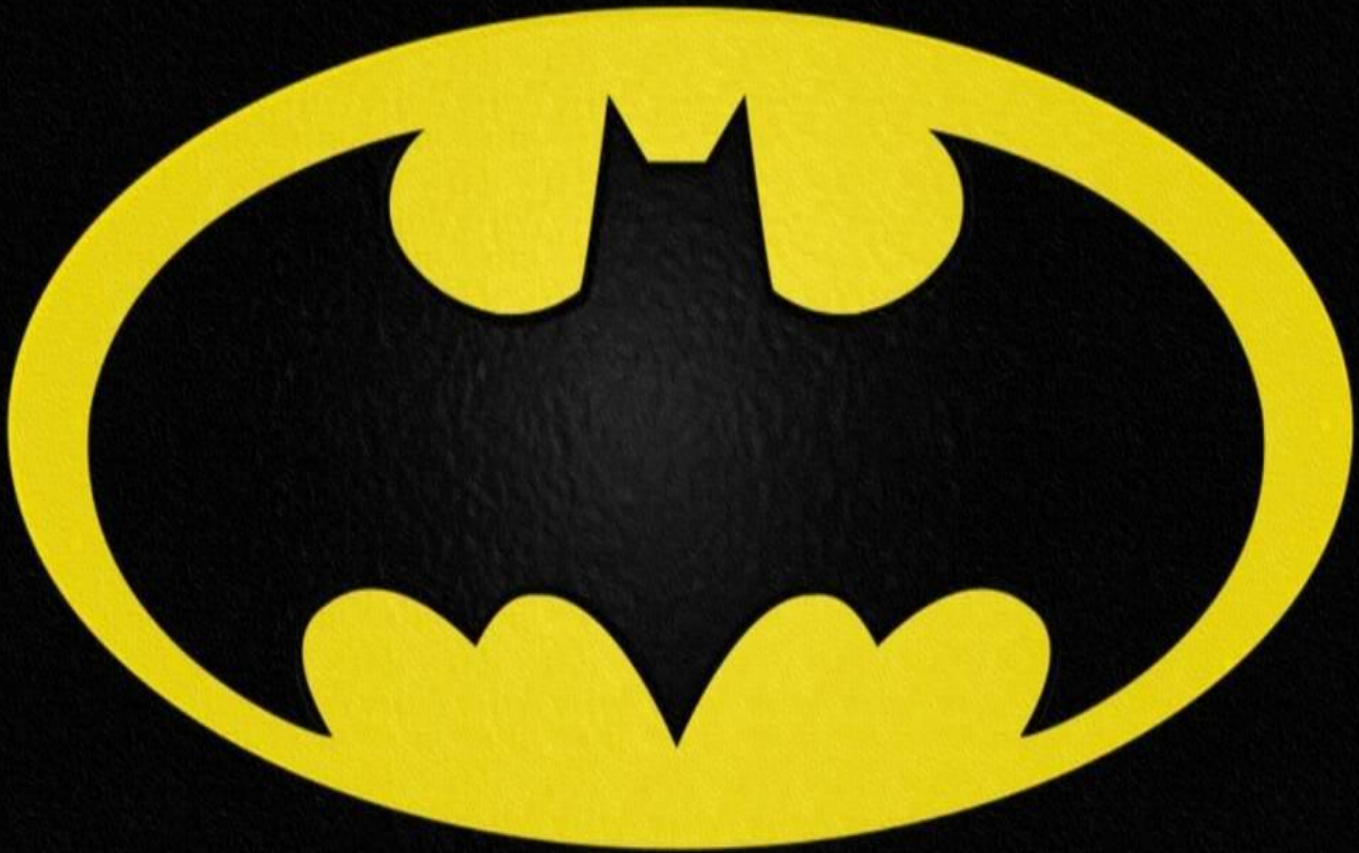
◆**Differences & Similarities**
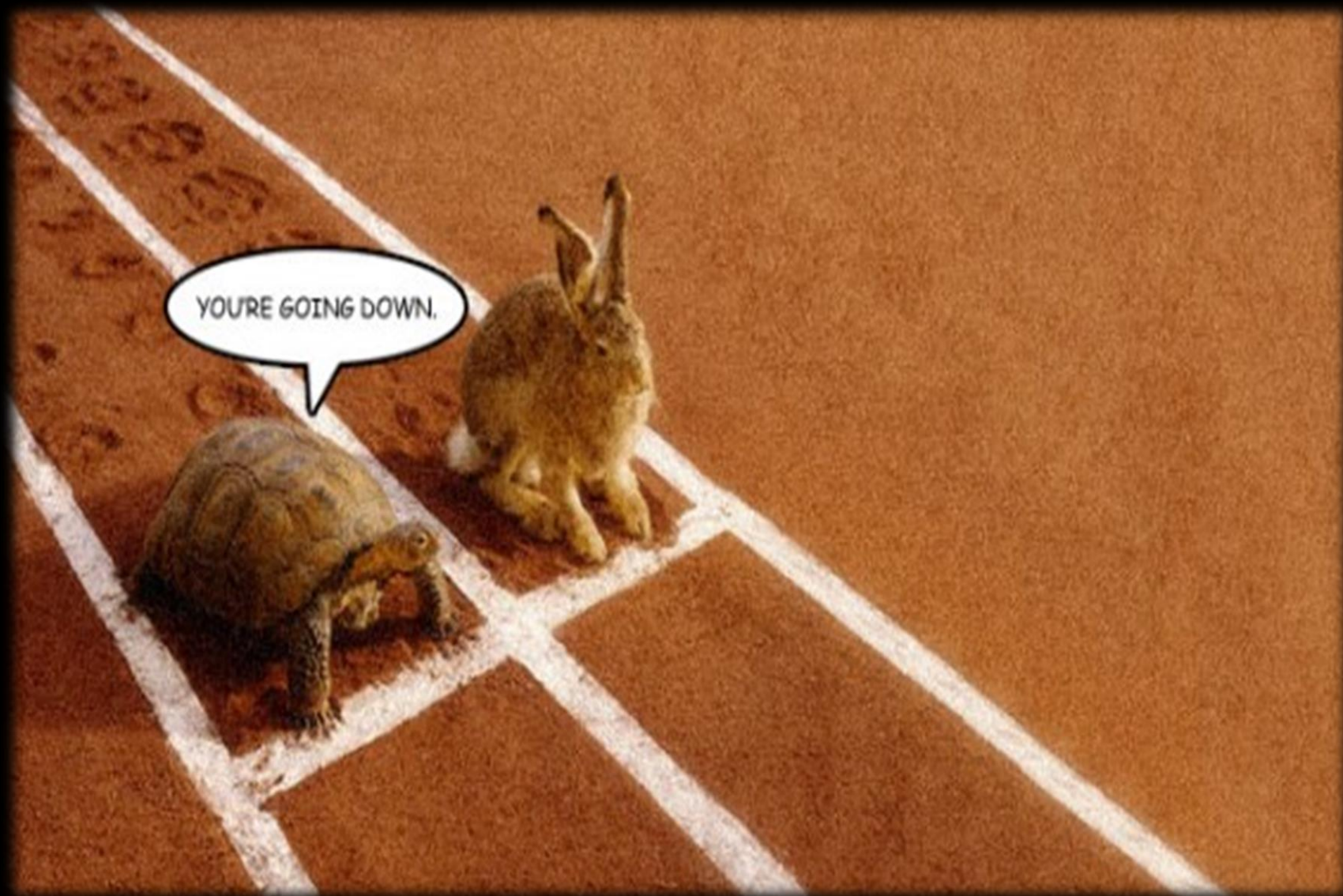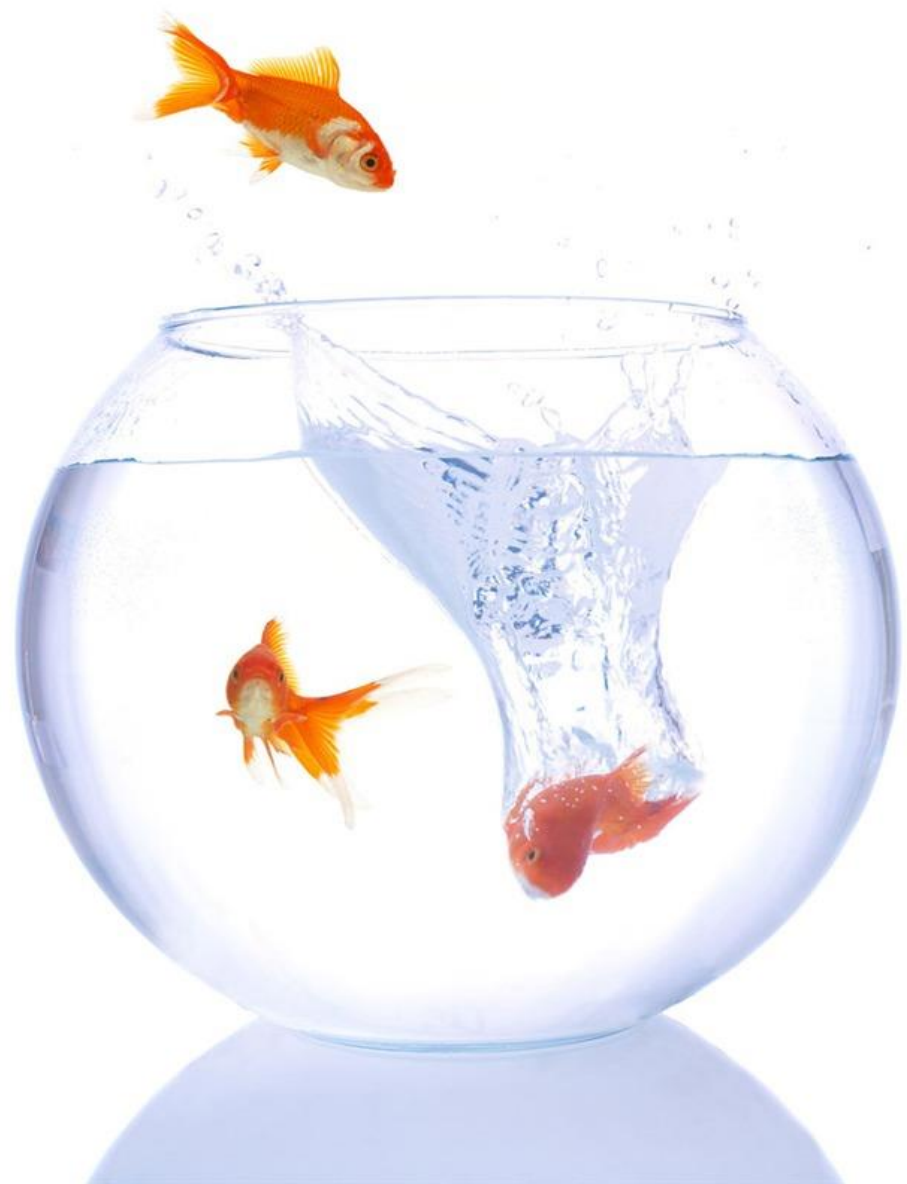
◆**The vAdmin & Managing the Mess**

What About You?
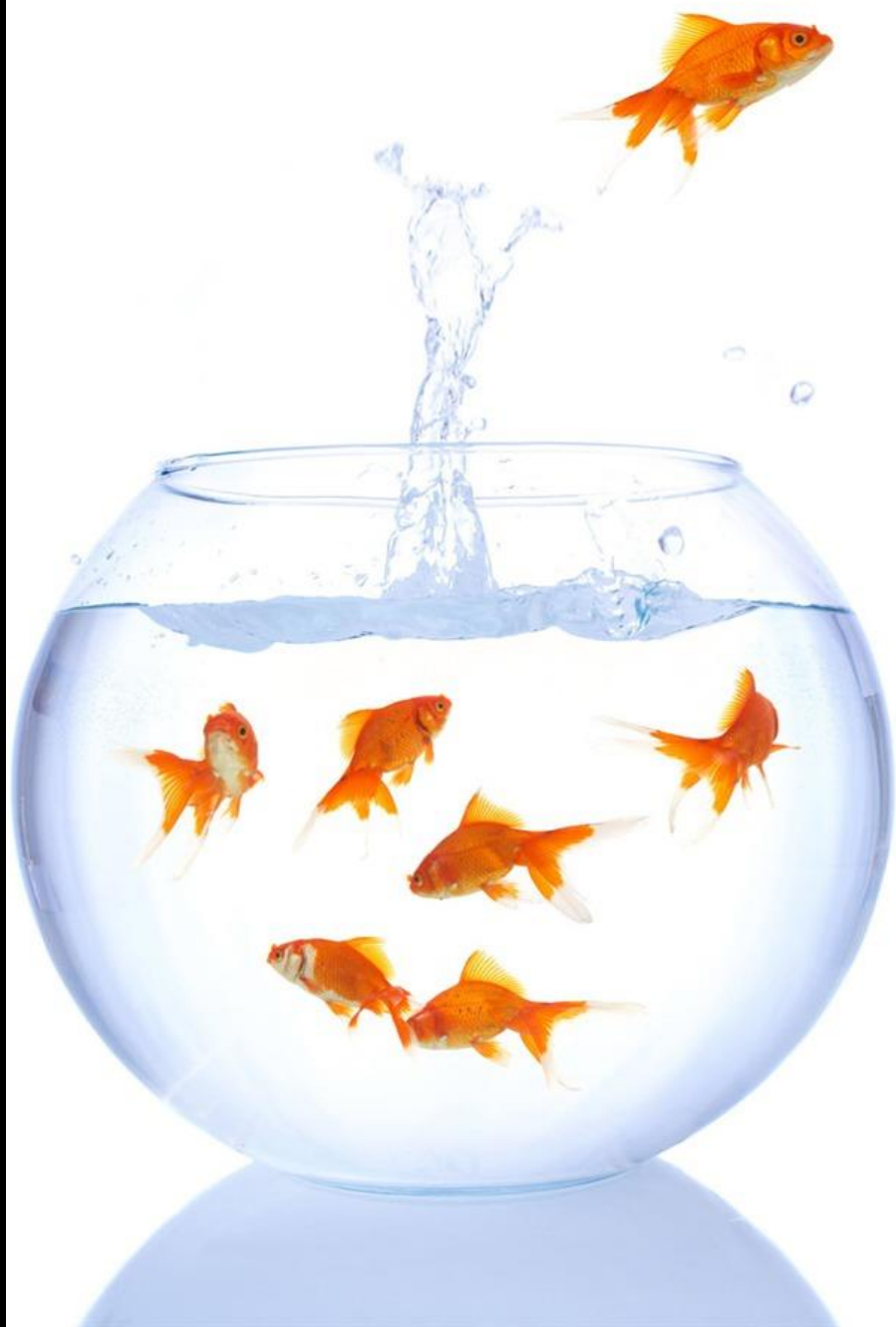
Adjective: different as chalk and cheese –
Two things that are different, particularly two things that are superficially alike, but very different in substance.

Monolithic Design (VMware)

Controlling Layer

Main Partition

VM1

VM2

Hypervisor Layer/VMM/VM Kernel

Device Drivers

Device Drivers

Code Size: 32 MB

Product Components

Resource Scheduling

Distributed File System

Network Stack

Storage Stack

Hardware Layer

Physical Network

Storage Devices

Microkernelized Design (Hyper-V)

Controlling Layer

Main Partition (OS)

Device Drivers

Device Drivers

VM1

VM2

Product Components

Live/Quick Migration

SMB and NTFS File Systems

Storage Migration

Hyper-V Replica

Hypervisor Layer/VMM/VM Kernel

Network Stack

Code Size: 600 KB

Storage Stack

Hardware Layer

Physical Network

Storage Devices

Monolithic Design (VMware)

Controlling Layer — Main Partition, VM1, VM2

Hypervisor Layer/VMM/VM Kernel — Device Drivers, Device Drivers, Code Size: 32 MB

Product Components — Resource Scheduling, Distributed File System, Network Stack, Storage Stack

Hardware Layer — Physical Network, Storage Devices
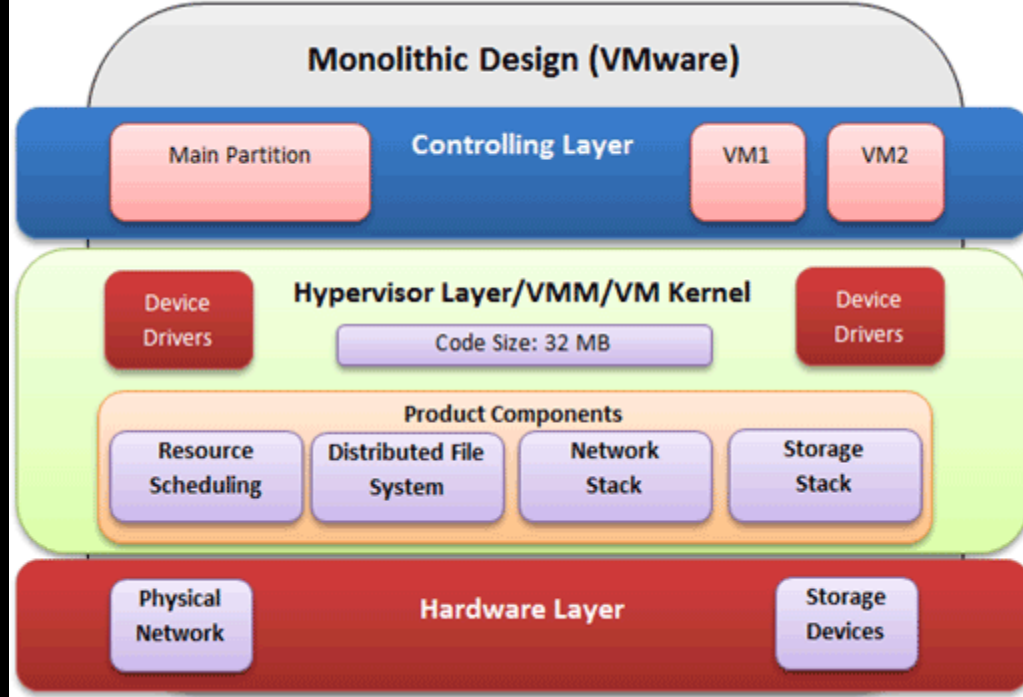
- Code injection in Hypervisor Layer
- Requires compatible hardware & device drivers
- No security patches or operating system required in the Controlling Layer

- No code injection possible in Hypervisor Layer
- Device drivers do not need to be hypervisor aware
- Controlling Layer requires OS = less secure

Microkernelized Design (Hyper-V)

Controlling Layer — Main Partition (OS), Device Drivers, Device Drivers, VM1, VM2

Product Components — Live/Quick Migration, SMB and NTFS File Systems, Storage Migration, Hyper-V Replica

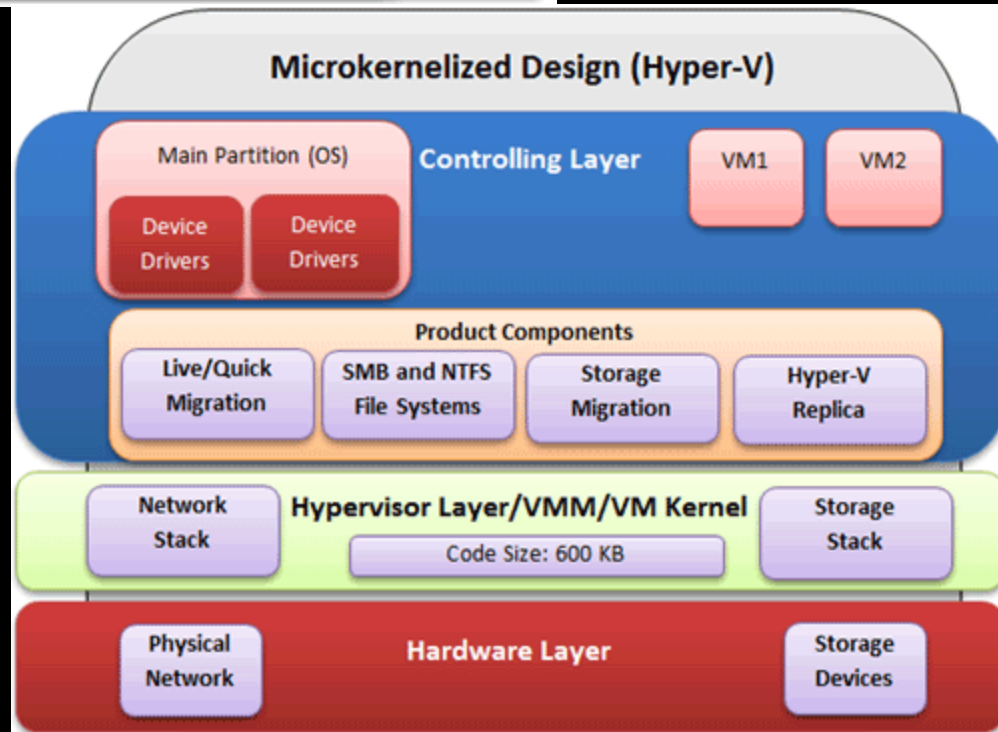Hypervisor Layer/VMM/VM Kernel — Network Stack, Storage Stack, Code Size: 600 KB

Hardware Layer — Physical Network, Storage Devices

Comparison Sites

www.virtualizationmatrix.com - Andreas Groth

Perficient Whitepaper - http://bit.ly/1lKAFD2

Keith Mayer's writeup - http://bit.ly/1e0icwW

Aidenfinn.com

Comparison Sites

Virtualization Matrix

AGNOSTIC VIRTUALIZATION COMPARISON

Virtualization Matrix   Blog   Contact   Matrix Help   About

Matrix Index
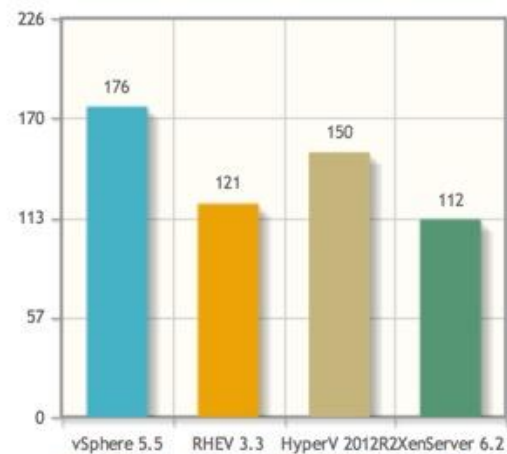
Matrix Index displayed for ' All ' Features ❓

Matrix Status

Status: Green (all products up to date)
New:
- New Vendor: Virtual Bridges (VERDE 7.1)
- RHEV 3.3 , IBM PowerVM

Recent Blogs

| All | General | Management | VM Mobility and HA | Hypervisor | Network and Storage | Cloud (Extensions) | (Exte |

Compare / Refresh   Change Vendor ⬍   Change Vendor ⬍   Change Vendor ⬍

Custom Analysis   Change Product ⬍   Change Product ⬍   Change Product ⬍
NEW

☑ Show Older releases   Change Edition ⬍   Change Edition ⬍   Change Edition ⬍
☑ Include Fee-Based

| General | **vm**ware | ❤ red hat | **Microsoft** |

| Version | vSphere 5.5 | RHEV 3.3 | HyperV 2012R2 |

Deployment Options

Hyper-V

- DVD
- USB
- PXE: Windows Deployment Services
- PXE: Microsoft Deployment Toolkit 2012 U1 & 2013
- PXE: System Center 2012 SP1 & R2 – CM
- PXE: System Center 2012 SP1 & R2 – VMM

vSphere

- DVD
- USB
- PXE: From Network Location
- PXE: Auto Deploy - Stateless
- PXE: Auto Deploy – Stateless Caching
- PXE: Auto Deploy – Stateful Install

Technical Comparisons

System	Resource	Hyper-V (2012 R2)	vSphere 5.5 Enterprise Plus
Host	Logical Processors	320	320
	Physical Memory	4TB	4TB
	Virtual CPUs per Host	4096	4096
VM	Virtual CPUs per VM	64	64
	Memory per VM	1TB	1TB
	Active VMs per Host	1,024	512
	Guest NUMA	Yes	Yes
Cluster	Maximum Nodes	64	32
	Maximum VMs	8,000	4,000
Guest OS	Supported Operating Systems	Limited	Wide Range

Resource Comparison

Capability	Hyper-V (2012 R2	vSphere 5.15Enterprise Plus
Dynamic Memory	Yes	Yes
Resource Metering	Yes	Yes
Quality of Service	Yes	Yes
Data Center Bridging (DCB)	Yes	Yes

Storage Comparison

Capability	Hyper-V (2012 R2)	vSphere 5.5 Enterprise Plus
Virtual Fiber Channel	Yes	Yes
3rd Party Multipathing (MPIO)	Yes	Yes (VAMP)
Native 4-KB Disk Support	Yes	No
Maximum Virtual Disk Size	64TB VHDX	2TB VMDK
Maximum Pass Through Disk Size	256TB+[2]	64TB
Offloaded Data Transfer	Yes	Yes (VAAI)
Boot from USB Disk	Yes[4]	Yes
Tiered Storage Pooling	Yes	No

Scalability Comparison

Capability	Hyper-V (2012 R2)	vSphere 5.5 Enterprise Plus
Nodes per Cluster	64	32
VMs per Cluster	8,000	4,000
Max Size Guest Cluster (iSCSI)	64 Nodes	32 Nodes
Max Size Guest Cluster (Fiber)	64 Nodes	5 Nodes
Max Size Guest Cluster (File Based)	64 Nodes	0 Nodes
Guest Clustering with Live Migration Support	Yes	No
Guest Clustering with Dynamic Memory Support	Yes	No

High Availability Comparison

Capability	Hyper-V (2012 R2)	vSphere 5.5 Enterprise Plus
Incremental Backups	Yes	Yes
VM Replication	Yes	Yes
NIC Teaming	Yes	Yes
Integrated High Availability	Yes	Yes
Guest OS Application Monitoring	Yes	No
Failover Prioritization	Yes	Yes
Affinity Rules	Yes	Yes
Cluster-Aware Updating	Yes	Yes

Networking Comparison

Capability	Hyper-V (2012 R2)	vSphere 5.5 Enterprise Plus
Extensible vSwitch	Yes	Replaceable
Confirmed Partner Extensions	5	2
Private Virtual LAN (PVLAN)	Yes	Yes[1]
ARP Spoofing Protection	Yes	vCNS/Partner
DHCP Snooping Protection	Yes	vCNS/Partner
Virtual Port ACLs	Yes	vCNS/Partner
Trunk Mode to Virtual Machines	Yes	Yes
Port Monitoring	Yes	Yes
Port Mirroring	Yes	Yes

Disk Files

What	VMware	Hyper-V
Virtual hard disk, VMware: disk descriptor contains flat.vmdk (raw data) config	.VMDK	.VHD, .VHDX
Snapshot, differencing file – VM state – VMware: see -DELTA.VMDK	.VMSN	.AVHD
Snapshot information – snapshot metadata	.VMSD	.XML
VM primary configuration file (1). (Microsoft Virtual server uses the VMC filetype)	.VMX	.XML
Saved state, memory, paging – Hyper-V: Additional .VSV and .BIN files are created for each running snapshot. VMware: paging file. Present when VM is running or has crashed	.VMEM	.VSV, .BIN
Virtual floppy disk	.FLP	.VFD
Template – VHD should be sysprepped to change SSID and MACs or scripts run to clone hardware into a new xml (4). OVF may have a manifest, .MF file	.OVF, .VMTX, .VMTD	.VHD, .OVF
Driver files (2)	VIB	INF

Integrating Virtual Machines
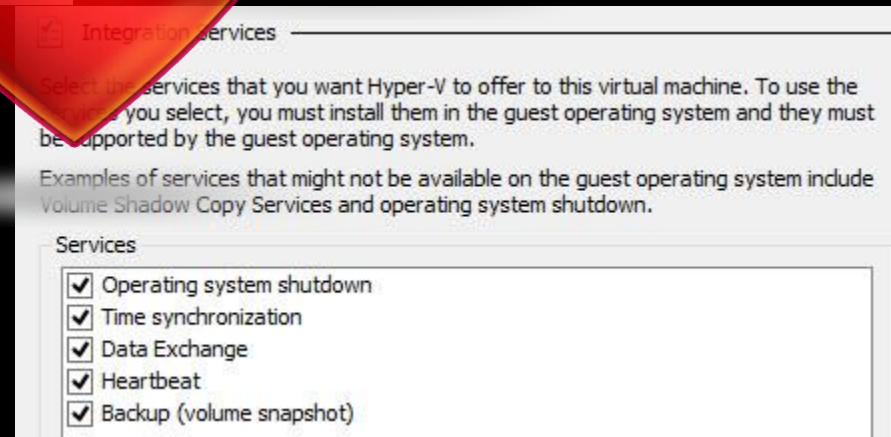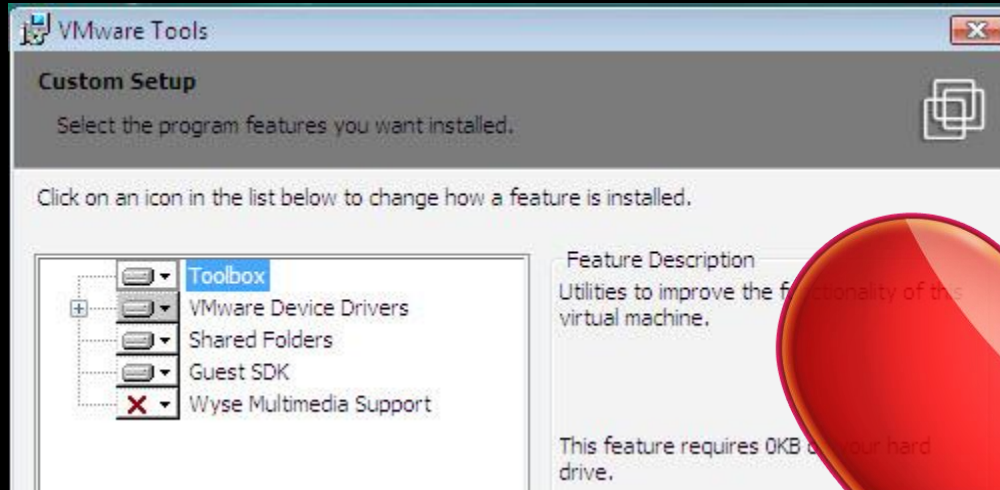
vSphere 5.5

Linux:
- Asianux
- SUSE
- RedHat
- Fedora
- CentOS
- OS X (Darwin) *
- E-Com Station
- Debian
- FreeBSD
- Mandrake
- Java Desktop
- Oracle desktop *
- TurboLinux
- Ubuntu
- Solaris*
- SCO
- Netware

Other?:
- OS/2 Warp

Windows:
- Server 2012 / R2
- Server 2008 / R2
- Server 2003 / R2
- Server 2000
- Server NT
- Windows 8.1
- Windows 7
- Windows Vista
- Windows XP
- Windows 98
- Windows ME
- Windows 95
- Windows 3.1
- DOS

Hyper-V 2012 R2

Linux:
- Asianux
- SUSE
- RedHat
- Fedora
- CentOS
- OS X (Darwin)
- E-Com Station
- Debian
- FreeBSD
- Mandrake
- Java Desktop
- Oracle desktop
- TurboLinux
- Ubuntu
- Solaris
- SCO
- Netware

Other?:
- OS/2 Warp

Windows:
- Server 2012 / R2
- Server 2008 / R2
- Server 2003 / R2
- Server 2000
- Server NT
- Windows 8.1
- Windows 7
- Windows Vista
- Windows XP
- Windows 98
- Windows ME
- Windows 95
- Windows 3.1
- DOS

The Basics

Many basic Admin tasks are accomplished in similar ways, while others are not so similar

➢ Create a guest
➢ Power control
➢ Guest settings
➢ Create storage
➢ Connecting to a Guest
➢ Snapshots
➢ "Tools" installation
➢ Resource Allocation
➢ Updates & Patches
➢ Templates & Clones

Product View

	vmware	**Microsoft**
Self-Service	vCloud Director	App Controller
Service Mgmt.	vCloud Automation Center	Service Manager
Protection	vSphere Data Protection	Data Protection Manager
Automation	vCenter Orchestrator	Orchestrator
Monitoring	vCenter Ops Mgmt. Suite	Operations Manager
VM Management	vCenter Server vFabric Application Director	Virtual Machine Manager
Hypervisor	vSphere Hypervisor	Hyper-V

Licensing View

vmware®   **Microsoft**

	vmware	Microsoft
Self-Service		
Service Mgmt.		
Protection		
Automation	**vCloud Suite** Enterprise Edition ($22,990* - 2CPU + S&S)	**System Center 2012 SP1** Datacenter Edition ($3,607* - 2 CPUs incl. SA)
Monitoring		
VM Management		
Hypervisor		Hyper-V (Free)

Terminology

What	VMware	Hyper-V
Move guest from host to host	vMotion	Live Migration
Move guest storage	Storage vMotion	Quick Storage Migration
Storage	Datastores	Volumes ("Storage Nothing")
Object Heiarchy	Datacenter	Fabric
Scripting	PowerCLI & Workflows	PowerShell & Runbooks
Dynamic Core Resource	DRS	*PRO (Performnace & Resource Optimizations)
High Availablity	HA	Failover Clustering
Guest Memory Allocation	Resource Allocation & Reservation	Dynamic Memory
DR	SRM	Replica

How Do We Manage Them Today?

<u>vSphere</u> -
- ➤ vCenter, vCenter Client
- ➤ vCLI
- ➤ vMA
- ➤ PowerCLI
- ➤ 3rd Party - HotLink

<u>Hyper-V</u> -
- ➤ Virtual Machine Manager (VMM) (also called Hyper-V Manager)
- ➤ Failover Cluster Manager
- ➤ System Center Virtual Machine Manager (SCVMM)
- ➤ Service Console (SC)
- ➤ PowerShell
- ➤ 3rd Party – 5Nines, HVRemote, vUtilites, etc. (some limited)

VMware's Rant on SCVMM

VMware Whitepaper:

➢ Opening line "Why trying to use SCVMM 2012 will frustrate vSphere administrators"

➢ Microsoft is trying to convince vSphere administrators to manage their VMware environment using System Center Virtual Machine Manager 2012 (SCVMM 2012). However, vSphere administrators will find that SCVMM 2012 -

   ➢ 1. Increases Complexity While Adding Little Value

   ➢ 2. Is Not a "Single Pane Of Glass Interface", vCenter Server Is Still Required

   ➢ 3. Adds New Overheads, Delivers Little Benefit

   ➢ 4. Degrades Operational Efficiency, Frustrating Administrators

➢ SCVMM 2012 offers only rudimentary management capabilities for VMware environments and introduces unnecessary complexity, overhead and frustration for vSphere administrators.

F. U. D.

Multi-Hypervisor Management

➢ OpenStack Compute ("Nova" – soon to be "Ironic")

➢ VMware Multi-Hypervisor Manager

➢ HotLink (vC Plugin)

➢ SCVMM 2012 R2 – Although VMware disagrees -
  ➢ http://www.vmware.com/files/pdf/getthefacts/vmw-limitations-of-managing-vSphere-with-MS-SCVMM.pdf

➢ ConVirt Enterprise

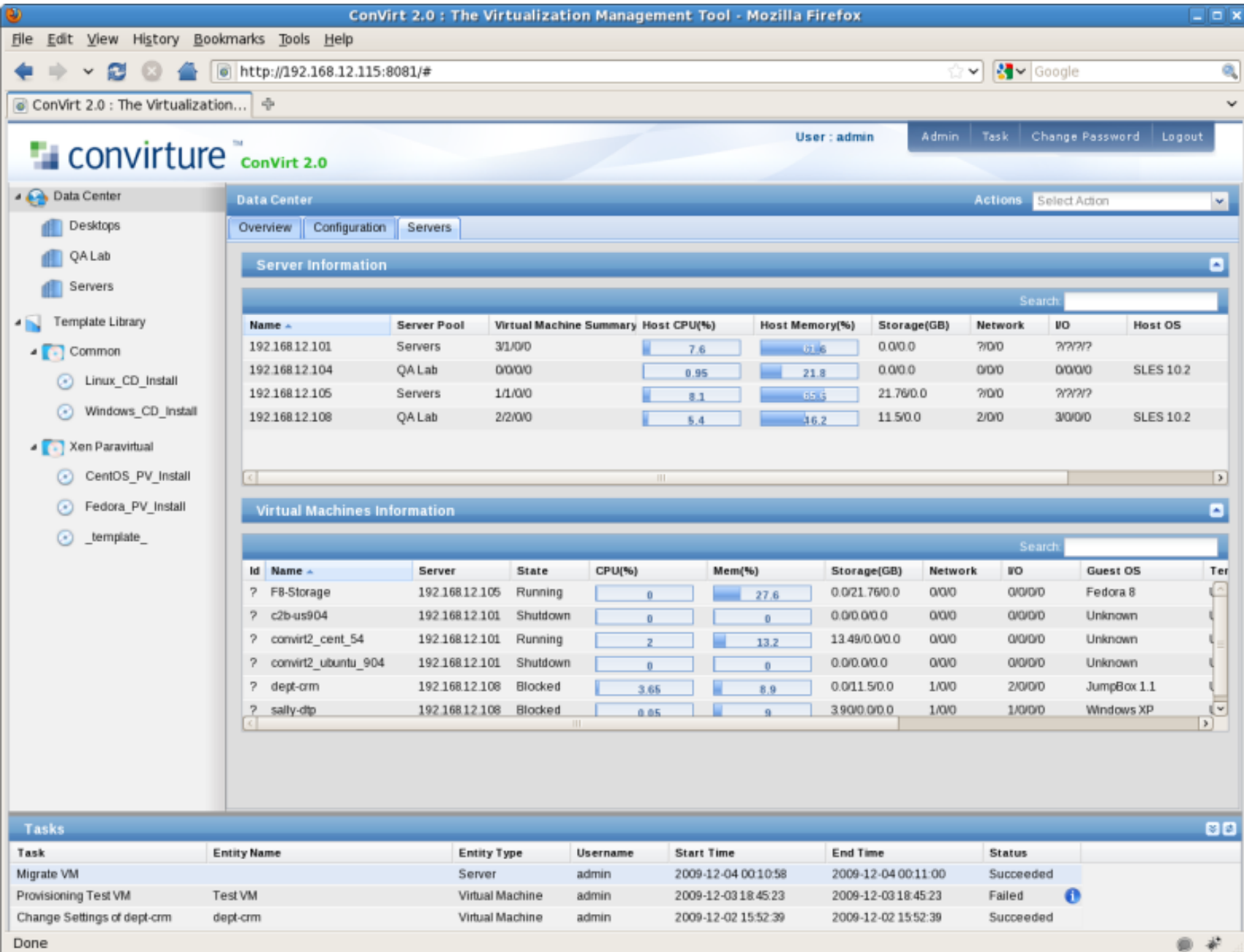➢ Embotics

➢ PowerShell (PowerCLI)

➢ What else is out there?

OpenStack Compute (Nova)

https://wiki.openstack.org/wiki/HypervisorSupportMatrix

convirture

convirture ConVirt 2.0

User : admin   Admin   Task   Change Password   Logout

- Data Center
  - Desktops
  - QA Lab
  - Servers
- Template Library
  - Common
    - Linux_CD_Install
    - Windows_CD_Install
  - Xen Paravirtual
    - CentOS_PV_Install
    - Fedora_PV_Install
    - _template_

Data Center

Actions Select Action

Overview | Configuration | Servers

Server Information

Search:

Name ▲	Server Pool	Virtual Machine Summary	Host CPU(%)	Host Memory(%)	Storage(GB)	Network	I/O	Host OS
192.168.12.101	Servers	3/1/0/0	7.6	61.6	0.0/0.0	?/0/0	?/?/?/?	
192.168.12.104	QA Lab	0/0/0/0	0.95	21.8	0.0/0.0	0/0/0	0/0/0/0	SLES 10.2
192.168.12.105	Servers	1/1/0/0	8.1	65.6	21.76/0.0	?/0/0	?/?/?/?	
192.168.12.108	QA Lab	2/2/0/0	5.4	46.2	11.5/0.0	2/0/0	3/0/0/0	SLES 10.2

Virtual Machines Information

Search:

Id	Name ▲	Server	State	CPU(%)	Mem(%)	Storage(GB)	Network	I/O	Guest OS	Ter
?	F8-Storage	192.168.12.105	Running	0	27.6	0.0/21.76/0.0	0/0/0	0/0/0/0	Fedora 8	
?	c2b-us904	192.168.12.101	Shutdown	0	0	0.0/0.0/0.0	0/0/0	0/0/0/0	Unknown	
?	convirt2_cent_54	192.168.12.101	Running	2	13.2	13.49/0.0/0.0	0/0/0	0/0/0/0	Unknown	
?	convirt2_ubuntu_904	192.168.12.101	Shutdown	0	0	0.0/0.0/0.0	0/0/0	0/0/0/0	Unknown	
?	dept-crm	192.168.12.108	Blocked	3.65	8.9	0.0/11.5/0.0	1/0/0	2/0/0/0	JumpBox 1.1	
?	sally-dtp	192.168.12.108	Blocked	0.05	9	3.90/0.0/0.0	1/0/0	1/0/0/0	Windows XP	

Tasks

Task	Entity Name	Entity Type	Username	Start Time	End Time	Status
Migrate VM		Server	admin	2009-12-04 00:10:58	2009-12-04 00:11:00	Succeeded
Provisioning Test VM	Test VM	Virtual Machine	admin	2009-12-03 18:45:23	2009-12-03 18:45:23	Failed
Change Settings of dept-crm	dept-crm	Virtual Machine	admin	2009-12-02 15:52:39	2009-12-02 15:52:39	Succeeded

Done

Embotics v-Commander

PowerShell and PowerCLI

T-Shirt Material

Rob Campbell
@mjolinor

@sunnyc7 @dfinke @jsnover My distillation
of the end result: if ($admin.skillset -
notcontains 'Powershell') {$admin.future -eq
$null}

PowerShell & PowerCLI

➢ Hyper-V cmdlets are native to the PowerShell "core" in Server 2012+ & Win 8.x.

➢ PoSh v4 has all the cmdlets (v5 adds even more)

➢ You do not need to install the Hyper-V role, just the Module

➢ PowerCLI is vSphere version backwards compatible & requires VIX install (API)

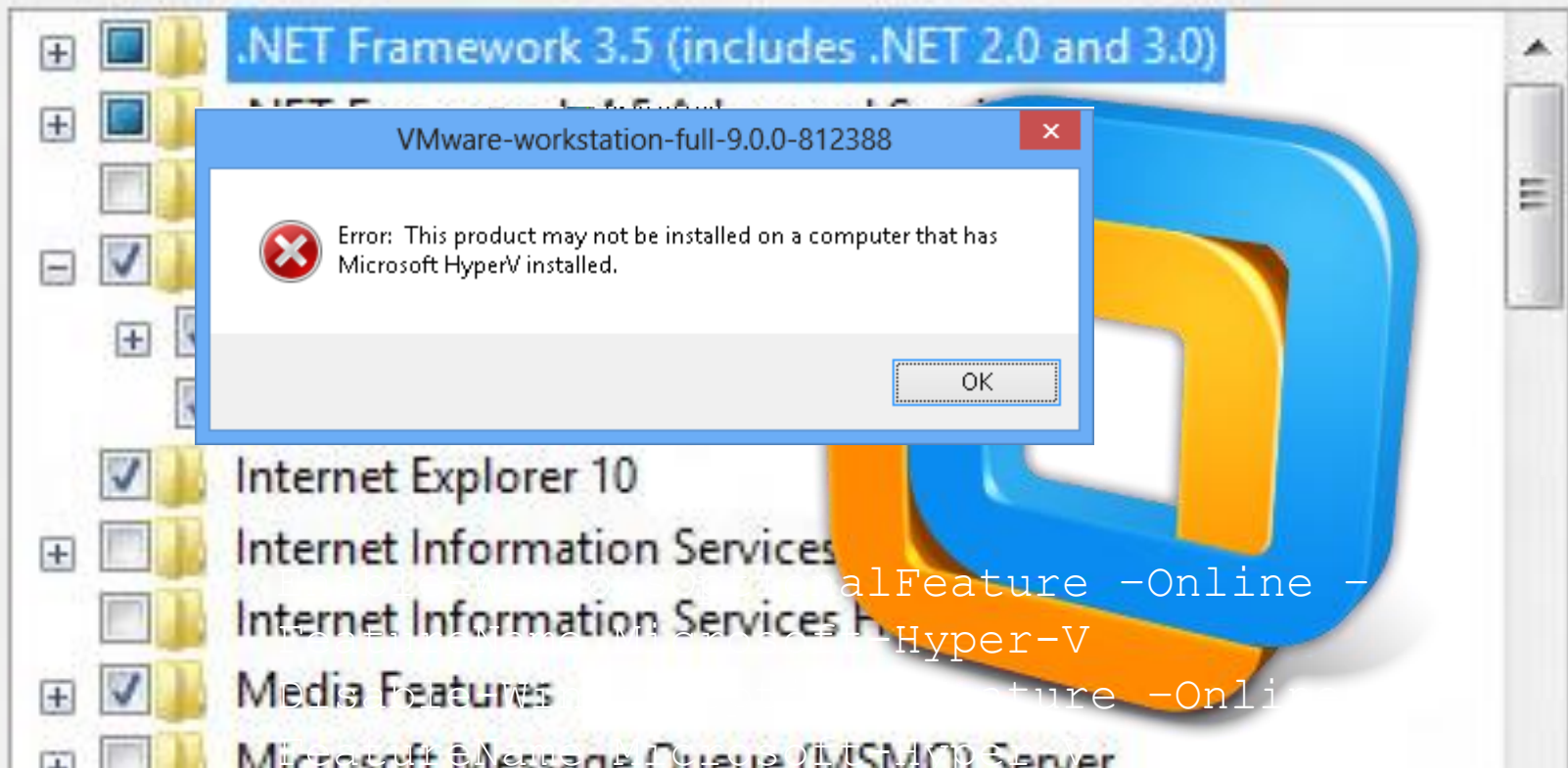➢ You can run both together, but watch for cmdlet "collision"!

The Setup

➢ Enable the Hyper-V Role or just the Module

➢ Install PowerCLI

➢ Modify your PoSH profile to add the vSphere snapins (yes, they are still snapins)

- ➢ `add-pssnapin vmware.vimautomation.core`
- ➢ `add-pssnapin vmware.vumautomation (only if installed Update Manager CLI)`
- ➢ `add-pssnapin vmware.vimautomation.license`
- ➢ `add-pssnapin vmware.imagebuilder`
- ➢ `add-pssnapin vmware.deployautomation`

➢ Run PowerShell as Administrator and Set-ExecutionPolicy Unrestricted (or Unsigned)

➢ Remember the gotcha – prefix the cmdlet with the module name

- ➢ `Get-Command –CommandType cmdlet | Group Name | Where {$_.Count –gt 1}`
- ➢ `get-command -CommandType cmdlet | Group Name | Where{$_.Count -gt 1} | Foreach {get-command $_.name | select name, pssnapin, module}`

To turn a feature on, select its check box. To turn a feature off, clear its check box. A filled box means that only part of the feature is turned on.

.NET Framework 3.5 (includes .NET 2.0 and 3.0)

VMware-workstation-full-9.0.0-812388 ✕

Error: This product may not be installed on a computer that has Microsoft HyperV installed.

OK

Internet Explorer 10

Internet Information Services

Internet Information Services H

Media Features

Microsoft Message Queue (MSMQ) Server

alFeature -Online -

-Hyper-V

ture -Onli

KNOWLEDGE
IS
POWER,
BUT
ENTHUSIASM
PULLS
THE
SWITCH

Thank You!

Don't forget the Surveys