Hyper-V for VMware Administrators: A Crash Course

2014 Edition

ngenx

ANY APP | ANY DEVICE | ANYWHERE

CRASH COURSE

Mike Nelson - Briforum 2014

RTFM

“If you want them to RTFM, make a better FM”

Helen Abbott, Klocwork

Windows PowerShell

```
Windows PowerShell
Copyright (C) 2014 Microsoft Corporation. All rights reserved.

PS C:\Users\Mike>
```

Topics

- Questions
- The History
- Differences & Similarities
- The vAdmin & Managing the Mess

What About You?

LOST
CONFUSED
UNSURE
UNCLEAR
PERPLEXED
DISORIENTED
BEWILDERED

PLAY
NICE

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Kanpai-Japan.com

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HYPERVISOR AS A
DIFFERENTIATOR
RIP 2012

HYPERVISOR AS A
DIFFERENTIATOR
RIP 2013

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
Code Size: 32 MB
Device Drivers
Product Components
Resource Scheduling
Distributed File System
Network Stack
Storage Stack
Hardware Layer
Physical Network
Storage Devices

Microkernelized Design (Hyper-V)
Main Partition (OS)
Device Drivers
Device Drivers
Controlling Layer
VM1
VM2
Product Components
Live/Quick Migration
SMB and NTFS File Systems
Storage Migration
Hyper-V Replica
Network Stack
Hypervisor Layer/VMM/VM Kernel
Code Size: 600 KB
Storage Stack
Physical Network
Hardware Layer
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

Virtualization Matrix

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

Blogs

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

Compare / Refresh

Custom Analysis (NEW)

Show Older releases

Include Fee-Based

	Change Vendor	Change Vendor	Change Vendor
	Change Product	Change Product	Change Product
	Change Edition	Change Edition	Change Edition
General	vmware	redhat	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

Source – Virtualization JumpStart Series by Microsoft MVA

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

Source – Virtualization JumpStart Series by Microsoft MVA

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

Source – Virtualization JumpStart Series by Microsoft MVA

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	62TB 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

Source – Virtualization JumpStart Series by Microsoft MVA

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

Source – Virtualization JumpStart Series by Microsoft MVA

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

Source – Virtualization JumpStart Series by Microsoft MVA

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

Source – Virtualization JumpStart Series by Microsoft MVA

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

- Create a guest
- Power control
- Guest settings
- Connecting to a Guest
- Snapshots
- “Tools” installation
- Templates & Clones

The Basics

While Others Are Not

- Create & manage storage
- Clustering
- Networks & switches
- Permissions
- Recovery

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

* VMware Pricing: http://www.vmware.com/products/datacenter-virtualization/vcloud-suite/pricing.html - correct as of 12/31/2012

* Microsoft Pricing: http://www.microsoft.com/en-us/server-cloud/system-center/datacenter-management-buy.aspx - correct as of 12/31/2012

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 Hierarchy	Datacenter	Fabric
Scripting	PowerCLI & Workflows	PowerShell & Runbooks
Dynamic Core Resource	DRS	*PRO (Performance & Resource Optimizations)
High Availability	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.

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Multi-Hypervisor Management

- OpenStack Compute Nova or Ironic
- VMware Multi-Hypervisor Manager
- HotLink (vC Plugin)
- SCVMM 2012 R2
- ConVirt Enterprise
- Embotics
- PowerShell (PowerCLI)
- What else is out there?

Can it be done today?

Microsoft®

System Center 2012 R2
Virtual Machine Manager

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- Still limited to basic tasks
- Terminology & Standards issues

Example:
VMM does not automatically create port groups on VMware ESX hosts. Therefore, in order for logical networks to work correctly for managed ESX hosts, you must use VMware vCenter Server to configure port groups with the necessary VLANs that correspond to the network sites.

What about other Hypervisors?

OpenStack Compute (Nova - Ironic)

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

OpenStack Nova Control
Nova Agent Proxy
Cluster Admin (vCenter)
KVM Host
VM
VM
VM
VM
VM
VM
Nova Agent
Hypervisor
Operating System
XenServer Host
Nova Agent VM
VM
VM
VM
VM
VM
Bare Metal Hypervisor
ESX Host
VM
VM
VM
VM
VM
VM
Clustered Bare Metal Hypervisor

Ref: OpenStack User Survey – May 2014

convirture

ConVirt 2.0 : The Virtualization Management Tool - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://192.168.12.115:8081/#

ConVirt 2.0 : The Virtualization...

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

HotLink

HotLink SuperVISOR for VMware
VMware vCenter Console
vCenter Server
HotLink
SuperVISOR Server
vSphere
vSphere
Hyper-V
Xen
KVM

HotLink

Plug-in
VMware
Citrix
Microsoft
Red Hat
Platform
Integration Services
Native Virtual Interface
API (now) & Adapters (future)
Transformation Engine
Proxy Engine
Task Engine
Virtual Object Bus
Transformation
VMware
Xen
Hyper-V
KVM
Cloud
Physical
System Management
vCenter Server
Xen Center
Virtual Machine Mgr
Enterprise Virt Mgr
Cloud Management Console
System Management Console
Platform
vSphere
Xen
Hyper-V
KVM
EC2, etc.
Bare metal

PowerShell and PowerCLI

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I DON'T ALWAYS WRITE CODE,
BUT WHEN I DO, ITS IN POWERSHELL

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}`

Demo

Thank You!

Don't forget the Surveys