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# Walkthrough: Updating Tools in a vSphere Environment

### A VMware Tools is outdated on this virtual machine.

For keeping VMware Tools up to date, there are six different approaches that vSphere administrators can use to accommodate nearly any workflow required for flexible datacenter operations. These different techniques allow optimizing either for automation and standardization or for separation of responsibilities. A previous article provides an overview of the three types of VM Tools.

# VMware Tools Status is Relative to Underlying Host

Each ESXi host has a storage location for VM Tools installers, which is a configurable option and visibly referenced by the /productLocker symlink. The target can be either local to each host or point to a centralized repository of VM Tools on a shared datastore. For more information about setting up a shared Tools repository, see this earlier post or KB 2004018.

### productLocker -> /vmfs/volumes/NFS-C/vmtools\_shared

The VM Tools status for any given VM is always in the context of the underlying host. As demonstrated below, two different versions of Tools are considered "Current" because the underlying hosts are not identical.

TMDC Actions -							
Summary Monitor Manage Related Objects							
Top Level Objects Clusters Hosts Virtual Machines VM Ter							
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Name 1 🛦	VMware Tools Ve	ersio \	/Mware Too	DNS Name			
prod-e-10	9541 (Current	)	Running	prod-e-10			
prod-e-11	9541 (Current	)	Running	prod-e-11			
prod-e-12	9541 (Current	)	Running	prod-e-12			
prod-e-13	9541 (Current	)	Running	prod-e-13			
prod-e-14	9541 (Current	)	Running	prod-e-14			
prod-e-15	9541 (Current	)	Running	prod-e-15			
prod-e-16	10245 (Currer	nt)	Running	prod-e-16			
prod-e-17	9541 (Current	)	Running	prod-e-17			
prod-e-18	10245 (Currer	nt)	Running	prod-e-18			
prod-e-19	9541 (Current	)	Running	prod-e-19			
prod-e-20	10245 (Currer	nt)	Running	prod-e-20			

In vSphere 6.5, the version of VM Tools running on each guest is compared to the version associated with the underlying ESXi host on a periodic schedule. In vSphere 6.0 and prior this check is performed when certain virtual machine events occur, such as power-on or vMotion,. If the host has a newer version, the VM is considered out of date.

Note that there is no mechanism for VMs running on vSphere to *contact the mother ship* and learn about new versions of VM Tools – only the VM-to-host relationship is relevant. This explains why a VM may suddenly complain about having outdated VM Tools after migrating from one host to another – it is because the destination host has a more recent version in the product locker.





# VM Tools Type Determines Update Choices

A previous article explains why there are three types of VM Tools: the familiar Tools ISOs for all supported operating systems, plus two additional offerings in the form of binary packages for Linux. There are several ways to initiate VM Tools updates from vSphere or from within a guest. The following applies **only** to Windows and Linux guests using VM Tools ISOs except where noted. The VM Tools Linux packages – OVT and OSP – are not managed via vSphere, so they can only be installed and updated from within each guest OS using native package management tools.

# Six Ways to Keep VM Tools Updated

### 1. Automatic update on VM boot

The easiest way to keep VM Tools up to date is to check a box and forget about managing this element of infrastructure. Upon VM reboot, such as after installing guest OS patches, the VM Tools status will be checked and updated when necessary. In many cases, this will result in one additional reboot after the VM Tools installation completes.

## Tools Upgrades Check and upgrade VMware Tools before each power on

This approach may be viable for less-critical workloads, such as labs or test/dev environments. Imagine a scenario where VMs are rebooting unexpectedly due to a widespread infrastructure outage. After scrambling to get applications back online, administrators could find themselves facing unanticipated subsequent reboots if a VM Tools update happened to be available. This is an edge case, but one to keep in mind.

### 2. Initiate update to one or more VMs through the vSphere UI

In the vSphere Web Client, when a VM indicates that VM Tools are outdated, the adjacent button can be used to automatically initiate an update. This can be done interactively or in a completely hands-off fashion. In the latter case, administrators also have the option of suppressing any potential reboots on Windows VMs – this is a good option that enables coordination of reboots required after routine guest OS patching.

Important note for guests other than Windows and Linux: Solaris, FreeBSD, and Mac OS - VM Tools can only be updated using the manual interactive method. Currently, there is no automatic Tools update for these guests.

Going a step further, it is also possible to select multiple VMs in the Web Client UI and initiate a VM Tools update on all of them at once.



Install/Upgrade VMware Tools
VMware Tools includes drivers to improve graphics, mouse, networking, and storage for VMware virtual devices.
Upgrade VMware Tools on 11 of 11 virtual machines
Interactive Upgrade
The disk image with VMware Tools will be mounted onto the virtual CD/DVD drive. The guest OS of the virtual machine must be running. Then, go to the console to run the VMware Tools Upgrade wizard from the virtual CD/DVD.
<ul> <li>Automatic Upgrade</li> <li>VMware Tools will be upgraded without interacting with the guest OS. If required, the guest OS will be automatically rebooted. You can adjust the behavior using Advanced Options.</li> </ul>
Advanced Options: /S /v"/qn REBOOT=R"
Click Continue to proceed with these changes, or Cancel to make no changes.
Continue

### 3. VMware Update Manager: immediate, scheduled, or on boot

VMware Update Manager (VUM) has two very different roles to play when it comes to updating VM Tools. The first one fetches updated VM Tools ISOs in the form of the 'tools-light' VIB that is offered when needed in the normal ESXi patch stream. This patch is then pushed out to all managed hosts, in accordance to the baselines established by administrators. Once this occurs, individual VMs will begin to detect that a new version of VM Tools is available and ready for update.

	cluster3 - Stage Patches						
~ ~	1 Baselines 2 Hosts	Patches and extensions Select patches and extensions that you want to be staged.					
(	<ul><li>3 Patches and extensions</li><li>4 Ready to complete</li></ul>	All (3) Selected Objects					
		Patch Name	# Hosts	Product			
		Updates tools-light	😵 5	embeddedE			

The second role VUM has in managing VM Tools is to trigger updates for individual VMs in accordance to baselines. Keep in mind that VUM does this work by leveraging the vSphere methods described in the two previous sections. In one mode, VUM can be used to make various configuration changes to multiple VMs so that a Tools update is checked and performed as necessary on each guest reboot, just like an administrator can do using the technique shown in #1 above. The advantage of using VUM is that many VMs can be configured or un-configured for this option at once.

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•
*



The other mode VUM uses is to trigger a VM Tools update either immediately or at a scheduled time, just as an administrator can do manually as described in #2 above. One added benefit of using VUM to initiate these updates in this way is the ability to also remediate powered-off or suspended VMs, subsequently returning them to their initial state after update.

### 4. In-guest update - delegating control to app owners

Windows Server 2012 R2 Datacenter				
	VMware Tools can be updated.			
	to 13,22 to 13			

For scenarios where application owners demand tight control over activities that occur in the guest OS, there is an option to allow in-guest updates of VM Tools. A tray icon in Windows will indicate that an update is available, and the VM Tools configuration dialog box will permit interactive initiation of an update at a convenient time.

For equivalent functionality from a command-line utility, vmware-toolbox-cmd is offered for Linux as well as Windows guests. Keep in mind that for Linux this is only for the VM Tools ISOs, since OVT and OSP use a different process, as described in #6 below.

### 5. Mass updates through PowerCLI automation

For very large environments or for those that have established more mature operational processes, PowerCLI provides a powerful option for updating VM Tools. This approach can target particular groups of VMs in many convenient ways, such as by cluster, by guest OS version, tags, VM state, or other vSphere attributes.

VMware vSphere PowerCLI 6.0 Release 2	_	
PowerCLI C:\> Get-VM prod-*   Where-Object {\$ExtensionData.Guest.ToolsVersionStatus -eq 'guestToolsNeedUpgra	de'	•
<pre>&gt;&gt;&gt; -and \$PowerState -eq "PoweredOn" }   Get-VMGuest   Where-Object { \$GuestFamily -eq "windowsGuest" }  </pre>		
>>> Update-Tools -NoReboot -RunAsync		

### 6. Native Linux package management processes

By nature of their design, Linux guests running OSPs or OVTs update VM Tools as part of a broader patching and updating workflow used for other components. This allows administrators to leverage existing Linux package managers or broader patch management and monitoring solutions without the need to coordinate with vSphere administrators.

### # yum update open-vm-tools

### 7. BONUS: VM Tools Upgrade Method (pardon the pun)

For advanced use cases where vSphere APIs are being used for deeper integration with other processes, consider the UpgradeTools\_Task for programmatic upgrades of VM Tools.

# Summary

With these flexible means of updating VM Tools, there is a suitable approach for any VMware datacenter, whether the requirement is centralized control, automation, delegation to app owners, or integration with existing patch management processes.



# Walkthrough: Upgrading VM Tools using vSphere Update Manager

# Upgrading VM Tools Using vSphere Update Manager

This product walkthrough will cover the steps to upgrade VM Tools using vSphere Update Manager

vm vSphere Client Menu ∨	Q Search in all environmen			C	? ~ A	dministrator@VSPHER	E.LOCAL 🗸	
Home Shortcuts	Shortcuts							
Hosts and Clusters VMs and Templates Storage Vetworking Content Libraries Global Inventory Lists	Hosts and Clusters	VMs and Templates	Storage	Q Networking	Content Libraries	Global Inventory Lists	Linked Domains	
<ul> <li>Policies and Profiles         Auto Deploy         Developer Center         vRealize Operations         &amp; Administration</li></ul>	Task Console	Event Console	VM Customization Specifications	VM Storage Policies	Host Profiles	Update Manager		
Update Manager          Tasks         Events         Tags & Custom Attributes	Administration							
Recent Tasks Alarms								*

Before we begin the upgrade of VM Tools, lets navigate to the Update Manager Settings for VMs.





On the current screen you can set the default settings for VM Rollback. This includes whether or not a snapshot should be taken of the VM and the time to retain the snapshot. Let's navigate to VMs and Templates view to begin our VM Tools Upgrade

<ul> <li>vcsa.vmware.demo</li> <li>Datacenter</li> <li>Servers</li> <li>VM01</li> <li>VM02</li> <li>VM03</li> <li>VM04</li> </ul>	Summary Monitor Configure Permiss Virtual Machines: 4	sions VMs	Updates	CPU USA 43 MH 43 MH 1.98 G 5TORAGE 27.8 C	ge 1 <b>2</b> USAGE i <b>B</b> USAGE <b>GB</b>
	Custom Attributes	^	Tags		^
	Attribute Value		Assigned Tag	Category Description	
	۲ No free	► ▼ ms to display	4	No items to di	isplay
	Edit		Assign Remove		
	No iter	ms to display	Assign Remove	No items to di	splay

Select the VM Folder or VM Object you wish to update and select the Updates Tab.



	Servers Actions ~	
P vcsa.vmware.demo / □ Datacenter √ □ Servers	Summary Monitor Config	ure Permissions VMs Updates
☆ VM01 ☆ VM02 ☆ VM03	VMware Tools VM Hardware	⚠️ 0 of 4 VMs are up to date
L vmo4	UPDATE MANAGER HOME	CHECK STATUS (checked 44 seconds ago)
		UPGRADE TO MATCH HOST SET AUTO UPDATE ~
		VM         Y         Host         Y         Tools Status         Y         Auto Update         Y
		VM04 host2.vmware.demo Upgrade Available Off
		VM02 host4.vmware.demo Guest Managed Off
		VM03         nost2.vmware.demo         Not installed         Off           VM01         host3.vmware.demo         Guest Managed         Off
		EXPORT 4 VM

If the status is unknown or not current, click on check status to get the latest versions of tools

vm vSphere Client Menu ∨	$Q_{c}$ Search in all environments	C 🧷 Administrator@VSPHERE.LOCAL 🗸 G
<ul> <li>Image: Constraint of the second se</li></ul>	Summary Monitor Configue VMware Tools VM Hardware UPDATE MANAGER HOME	re       Permissions       VMs       Updates <ul> <li>O of 4 VMs are up to date</li> <li>CHECK STATUS (checked just now)</li> </ul> UPGRADE TO MATCH HOST SET AUTO UPDATE ~                 VM

Recent Tasks Alarms

VM04 currently has an upgrade available, so we will select it to perform our upgrade. If tools are not installed or are guest managed they cannot be upgraded through Update Manager



	Servers Actions -	
Vcsa.vmware.demo	Summary Monitor Config	ure Permissions VMs Updates
	VMware Tools VM Hardware	⚠️ 0 of 4 VMs are up to date
► VM04	UPDATE MANAGER HOME	CHECK STATUS (checked 10 seconds ago)
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		VM y Host y Tools Status y Auto Update
		VM04 host2.vmware.demo Upgrade Available Off
		VM02 host4.vmware.demo Guest Managed Off
		VM03 host2.vmware.demo Not Installed Off
		VM01 host3.vmware.demo Guest Managed Off
		I EXPORT 4V

Recent Tasks Alarms

To perform our upgrade we will chose "Upgrade to Match Host"

		C ? V Administrator@VSPHERELOCAL V 🕃
Vesa vmware.demo Vesa vmware.	Summary       Monitor       Configure       Permissions         Upgrade       VMware       Tools to Match Host   Servers         Upgrading a virtual machine might require that it is powered on, powere       times. vSphere       Upgrade         < 1 VM will upgrade	VMs Updates
	VM y Host y Tools Status	Auto Update     P     Auto Update     P     Available     Off
	VM04 nost2.vmware.demo Upgrade Available	fanaged Off
	VM02 host4.vinware.demo Nict installed	alled Off
		UPGRADE TO MATCH HOST
Recent Tasks Alarms		

On the following screen will be a summary of changes being done. We see that 1 VM will be upgraded and that is VM04.



vm vSphere Client Menu V 🔍 Sea			۲ (? ×	Administrator@VSPHERE.L(	
□     □     ●       ✓     ✓     ✓       ✓     □     Datacenter	Summary Monitor Confi	♥ igure Permissions VMs	Updates		
<ul> <li>✓ Servers</li> <li>☑ VM01</li> <li>☑ VM02</li> <li>☑ VM03</li> <li>☑ VM04</li> </ul>	VMware Tools VM Hardware	1 of 4 VMs are	up to date cked 2 minutes ago	)	
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Scan entity 🗊 vSAN 🗸 Completed	com.vmw.a	are.vsan.h 14 ms	09/25/2019, 1:11:34 PM	09/25/2019, 1:11:52 PM	vcsa.vmware.demo
Initiated VMware			09/25/2019, 1:09:5	3 09/25/2019, 1:11:14	-
https://vcsa.vmware.demo/ui/					More Tasks

During the upgrade process the VM Tools will be updated and the VM will be rebooted if required.





# Walkthrough: Upgrading VM Compatibility using vSphere Update Manager

# Using vSphere Update Manager

Upgrading VM Compatibility

This product walkthrough will cover the steps to upgrade VM Compatibility using vSphere Update Manager

vm vSphere Client	Menu 🗸	Q Sea				C	? ~	Administrator@VSPHEF	e.local 🗸	$\odot$
Home Shortcuts Hosts and Clusters VMs and Templates			Shortcuts Inventories			0			- Charles	
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🏀 Administration Update Manager			Administratio	n						
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Before we begin the upgrade of VM Compatibility, lets navigate to the Update Manager Settings for VMs





On the current screen you can set the default settings for VM Rollback. This includes whether or not a snapshot should be taken of the VM and the time to retain the snapshot. Let's navigate to VMs and Templates view to begin our VM Compatibility Update.

vm vSphere Client Menu ∨ Q	Search in all environments	C	? ✓ Admin	iistrator@VSPHERE.LOCAL 🗸	٢
Image: Constraint of the second se	Summary Monitor Configure Permissions Virtual Machines: 3	VMs Upda	ates	CPU USAG O Hz MEMORY U O B STORAGE 144.01	ie JSAGE USAGE <b>MB</b>
	Custom Attributes       Attribute     Value       Image: state sta	Tags     Assi	igned Tag C	Description	↓ ↓

Select the VM Folder or VM Object you wish to update and select the Updates Tab.



vm vSphere Client Menu ∽ Q S	Search in all environments	C	× ۞ \	Administrator@VSPHERE.LOCA	· ~
<ul> <li>Image: Servers</li> <li>Image: VM01</li> <li>Image: VM02</li> <li>Image: VM03</li> </ul>	Summary Monitor Config VMware Tools VM Hardware UP DATE MANAGER HOME	UITE Permissions VMs	Updates up to date ked 14 minutes st .vmware.demo vmware.demo	ago) Host Compatibility T ESXI 6.5 and later (Version 13) ESXI 6.5 and later (Version 13) ESXI 6.5 and later (Version 13)	VM Compati ESXI 5.0 ar ESXI 6.5 ar
		4			•
https://vcsa.vmware.demo/ui/					· · · · · · · · · · · · · · · · · · ·

If the status is unknown or not current, click on check status to get the latest versions of compatibility.

♀ vcsa.vmware.demo	Summary Monitor Config	ure Permissions VMs Updates
ि VM01 □ VM02 □ VM03	VMware Tools VM Hardware	⚠️ 1 of 3 VMs are up to date
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		UPGRADE TO MATCH HOST
		VM         v         Host         v         Host Compatibility         v         VM Compatibility
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		VM03 host4.vmware.demo ESXI 6.5 and later (Version 13) ESXI 5.0
		VM01 host1.vmware.demo ESXi 6.5 and later (Version 13) ESXi 6.5
		EXPORT
		4

VM02 is currently out of date, so we will select it to perform our upgrade.



vm vSphere Client Menu ∨ Q s		C	× ۞ \	Administrator@VSPHERE.LOCA	· • 🛛 😳
Vin Vsprere Crient Wend V Q s	Servers Actions     Summary Monitor Config      WMware Tools     WM Hardware      UPDATE MANAGER HOME	gure Permissions VMs           A         1 of 3 VMs are           CHECK STATUS         (check           UP GRADE TO MATCH HOS         VM           VM         Host           VM02         host3           VM01         host1.	Updates Up to date ked 12 seconds ST .vmware.demo vmware.demo	Administrator@vSPHERELCOCA ago) Host Compatibility ESXI 6.5 and later (Version 13) ESXI 6.5 and later (Version 13) ESXI 6.5 and later (Version 13)	VM Compati ESXI 5.0 ar ESXI 5.0 ar ESXI 6.5 ar
		I EXPORT			Þ

https://vcsa.vmware.demo/ui/ <sup>S</sup>

To perform our upgrade we will chose "Upgrade to Match Host"

vm vSphere Client			٢
<ul> <li>✓ Ucsa.vmware.demo</li> <li>✓ Datacenter</li> <li>✓ Servers</li> <li>✓ VM01</li> <li>✓ VM02</li> <li>✓ VM03</li> </ul>	Summary         Monitor         Configure         Permissions           Upgrade         VM Hardware to Match Host   Servers         Upgrading a virtual machine might require that it is powered on, powered times. vSphere Update Manager will only upgrade 5 virtual machines per htems.         1 VM will upgrade           VMware does not recommend using Update Manager to upgrade hardware on Consider de-selecting any VAs in the following table.         1000000000000000000000000000000000000	VMs Updates  A off, or rebooted multiple host at one time.  n virtual appliances (VAs).	
	UM Y Host Y Host Compatibility Y	VM Compatibility VM Comp	ati
	VM02 host3.vmware.demo ESXi 6.5 and later (Version 13)	ESXI 5.0 and later (Versi d later (Versi d later (Versi ed later (Version 12) ESXI 5.0	
	VM03 host4.vmware.demo ESXi 6.5 and later (Version 13)	ESXI 5.0 and later (Versi	ar
	VM01 host1.vmware.demo ESXi 6.5 and later (Version 13)	) ESXI 6.5 and later (Version 13) ESXI 6.5	ar
	CANCEL CANCEL CANCEL CANCEL CANCEL CANCEL CANCEL CANCEL	UPGRADE TO MATCH HOST	•
Recent Tasks Alarms			\$

On the following screen will be a summary of changes being done. We see that 1 VM will upgrade and that VM02 is currently VM Version 10 and is going to be upgraded to VM Version 13



vm vSphere Client Menu ∨ Q s			C	? ×	Administrator@VSPHERE.I	LOCAL 🗸	٢
I Detacenter	Summary Monitor	CTIONS ~ Configure Pe	rmissions VMs	Updates			
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Initiate guest OS shutdown DO Completed	c	:om.vmware.vcInte	1 ms	09/24/2019, 1:13: PM	15 09/24/2019, 1:13:15 PM	vcsa.vmware.dem	10
Remediate entity Servers 56%	× A	Administrator@VS	16 ms	09/24/2019, 1:13: PM	10	vcsa.vmware.dem	10
						More	- Tasks

During the upgrade process the VM will be shutdown, compatibility upgraded, and then powered back on.

vm vSphere	Client Menu	✓ Q Search					C	, ? ?	Adn	ninistrator@VSPHERE.	LOCAL		٢
	99		🗀 Servers	ACTIONS ~									
✓   vcsa.vmware.d ✓   Datacenter	emo		Summary Monito	r Config	jure Pi	ermissions	VMs	Updates					
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						VM T VM02	Host host3	vmware.demo	Host	Compatibility i 6.5 and later (Versior	T 13)	VM Comp ESXI 6.5	
						VM03	host4	vmware.demo	ESX	i 6.5 and later (Version	n 13)	ESXI 5.0	
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Upgrade VM compatibility	В ∨мо2	✓ Completed		com.vmwar	e.vclnte	2 ms		09/24/2019, 1:13 PM	:45	09/24/2019, 1:13:46 PM	VCsal	/mware.demo	2
Initiate guest OS	🗗 VM02	<ul> <li>Completed</li> </ul>		com.vmw.ar	e.vdnte	1 ms		09/24/2019, 1:13	:15	09/24/2019, 1:13:15	vcsau	/mware.dem	c
All V												More	Tasks

Once the Upgrade is complete, click on the Summary Tab to View the current version of VM Compatibility.



vm vSphere Client Menu V Q Sea		C	🕐 🗸 Administrator	r@VSPHERE.LOCAL 🗸	٢
Image: Constraint of the second s	Image: Summary Monitor       Configure       Permissions         Summary Monitor       Configure       Permissions         Image: Summary Monitor       Guest OS:       Other 3.x or IC         Image: Summary Monitor       Guest OS:       Other 1.x or IC         Image: Summary Monitor       Summary ESXI 6.5 and       VMware Tools:         Image: Note Console       DNS Name:       box         Image: Note Console       Host:       host3.vmware         Launch Remote Console       Image: Summary Monitor       Image: Summary Monitor	ONS ~ Datastore later Linux (3 later (VM ve sion:2147483 re.demo	es Networks Update 2-bit) rsion 13) 647 (Guest Managed)	CPU USAG O Hz MEMORY U O B STORAGE U 286.21	e Isage Jsage <b>MB</b>
	VM Hardware	1	Notes		~
	Related Objects	~	Custom Attributes		~
	Tags	<b>~</b>	/Sphere HA		~
	VM Storage Policies	~			

Recent Tasks Alarms

VM Compatibility upgrade is now complete.





# Blog: Six Methods for Keeping VM Tools Up to Date

When it comes to keeping VM Tools up to date, there are six different approaches that vSphere administrators can use. That may sound like a lot, but after seeing each of the various options, it is clear that the intention is to accommodate nearly any workflow customers require for flexible datacenter operations. These different techniques allow optimizing either for automation and standardization or for separation of responsibilities. A previous article provides an **overview of the three types of VM Tools**.

# VMware Tools Status is Relative to Underlying Host

Recall that each ESXi host has a storage location for VM Tools installers, which is a configurable option and visibly referenced by the /productLocker symlink. The target can be either local to each host or point to a centralized repository of VM Tools on a shared datastore. For more information about setting up a shared Tools repository, see this earlier post or KB 2004018.

### productLocker -> /vmfs/volumes/NFS-C/vmtools\_shared

VM Tools status for any given VM is always in the context of the underlying host. As demonstrated below, two different versions of Tools are considered "Current" because the underlying hosts are not identical.

TMDC Actions -								
Summary Monitor Manage Related Objects								
Top Level Obje	ects Clusters Ho		Virtual Mac	hines VM Tem				
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1								
Name 1	VMware Tools Ve	ersio	VMware Too	DNS Name				
prod-e-10	9541 (Current)		Running	prod-e-10				
prod-e-11	9541 (Current)		Running	prod-e-11				
prod-e-12	9541 (Current)		Running	prod-e-12				
prod-e-13	9541 (Current)		Running	prod-e-13				
prod-e-14	9541 (Current)		Running	prod-e-14				
prod-e-15	9541 (Current)		Running	prod-e-15				
prod-e-16	10245 (Current)		Running	prod-e-16				
prod-e-17	9541 (Current)		Running	prod-e-17				
prod-e-18	10245 (Current)		Running	prod-e-18				
prod-e-19	9541 (Current)		Running	prod-e-19				
prod-e-20	10245 (Current)		Running	prod-e-20				

When certain virtual machine events occur, such as power-on or vMotion, the version of VM Tools running on that guest is compared to the version associated with the underlying ESXi host. If the host has a newer version, the VM is considered out of date.

Note that there is no mechanism for VMs running on vSphere to *contact the mother ship* and learn about new versions of VM Tools – only the VM to host relationship is relevant. This explains why a VM may suddenly complain about having out of date VM Tools after migrating from one host to another – the destination host has a more recent version in the product locker.





## VM Tools Type Determines Update Choices

Recall from the **previous post** that there are three types of VM Tools – the familiar Tools ISOs for all supported operating systems, plus two additional offerings in the form of binary packages for Linux. There are several ways to initiate VM Tools updates from vSphere or from within a guest. The following applies **only** to Windows and Linux guests using VM Tools ISOs except where noted. The VM Tools Linux packages – OVT and OSP – are not managed via vSphere, so they can only be installed and updated from within each guest OS using native package management tools.

# Six Ways to Keep VM Tools Updated

### 1. Automatic update on VM boot

The simplest way to keep VM Tools up to date is to check a box and forget about managing this element of infrastructure. Upon VM reboot, such as after installing guest OS patches, VM Tools status will be checked and an update installed if needed. In many cases, this will result in one additional reboot after VM Tools installation completes.

Tools Upgrades

### Check and upgrade VMware Tools before each power on

This approach may be viable for less-critical workloads, perhaps labs or test/dev environments. Imagine a scenario where VMs are rebooting unexpectedly due to a widespread infrastructure outage. After scrambling to get applications back online, administrators could find themselves facing unanticipated subsequent reboots if a VM Tools update happened to be available. This is an edge case, but one to keep in mind.

### 2. Initiate update to one or more VMs through the vSphere UI

In the vSphere Web Client, when a VM indicates that VM Tools are outdated an adjacent button can be used to automatically initiate an update. This can be done interactively or in a completely hands-off fashion. In the latter case, administrators also have the option of suppressing any potential reboots on Windows VMs – this is a good option that enables coordination of reboots required after routine guest OS patching.

Important note for guests other than Windows and Linux: Solaris, FreeBSD, and Mac OS VM Tools can only be updated using the manual interactive method. There is currently no automatic Tools update for these guests.

Going a step further, it is also possible to select multiple VMs in the Web Client UI and initiate a VM Tools update on all of them at once.



Install/Upgrade VMware Tools
VMware Tools includes drivers to improve graphics, mouse, networking, and storage for VMware virtual devices.
Upgrade VMware Tools on 11 of 11 virtual machines
Interactive Upgrade
The disk image with VMware Tools will be mounted onto the virtual CD/DVD drive. The guest OS of the virtual machine must be running. Then, go to the console to run the VMware Tools Upgrade wizard from the virtual CD/DVD.
Automatic Upgrade
VMware Tools will be upgraded without interacting with the guest OS. If required, the guest OS will be automatically rebooted. You can adjust the behavior using Advanced Options.
Advanced Options: /S /v"/qn REBOOT=R"
Click Continue to proceed with these changes, or Cancel to make no changes.
Continue

### 3. VMware Update Manager: immediate, scheduled, or on boot

VMware Update Manager (VUM) has two very different roles to play when it comes to updating VM Tools. The first one has to do with fetching updated VM Tools ISOs in the form of the 'tools-light' VIB that is offered when needed in the normal ESXi patch stream. This patch is then pushed out to all managed hosts according to baselines established by administrators. Once this occurs, individual VMs will begin to detect that a new version of VM Tools is available and will be eligible for update.

<ul><li>1 Baselines</li><li>2 Hosts</li></ul>	Patches and extensions Select patches and extensions that you want to be staged.           All         (3) Selected Objects					
3 Patches and extensions 4 Ready to complete						
	Patch Name	# Hosts	Product			
	☐ Undates tools light	<b>A</b> 5	omboddodE			

The second role VUM has in managing VM Tools is to trigger updates for individual VMs according to baselines. Keep in mind that VUM does this work by leveraging the vSphere methods described in the two previous sections. In one mode, VUM can be used to make a bulk configuration change to multiple VMs so that a Tools update is checked and performed as necessary on each guest reboot, just like an administrator can do using the technique shown in #1 above. The advantage of using VUM is that many VMs can be configured or un-configured for this option at once.

2	ToolTime - Edit VMware Tools upgrade settings	<ul> <li>**</li> </ul>					
To enable automatic upgrades of VMware Tools on power cycle for a virtual machine, select the check box next to the machine's name. W setting is selected, Update Manager performs a check on each power cycle and, if necessary, upgrades VMware Tools on the machine.							
		Q Filter -					
	Name	Туре					
$\checkmark$	prod-e-10	Virtual Machine					
$\checkmark$	prod-e-11	Virtual Machine					
Thou	sprod-e-12	Virtual Machine					

The other mode VUM uses is to trigger a VM Tools update either immediately or at a scheduled time, just as an administrator can do manually as described in #2 above. One added benefit of using VUM to initiate these updates in this way is the ability to also

remediate powered-off or suspended VMs, subsequently returning them to their initial state after update.

### 4. In-guest update - delegating control to app owners



For scenarios where application owners demand tight control over activities that occur in the guest OS, there is an option to allow in-guest updates of VM Tools. A tray icon in Windows will indicate that an update is available, and the VM Tools configuration dialog box will permit interactive initiation of an update at a convenient time.

For equivalent functionality from a command-line utility, vmware-toolbox-cmd is offered for Linux as well as Windows guests. Keep in mind that for Linux this is only for the VM Tools ISOs, since OVT and OSP use a different process, as described in #6 below.

Enable guest-initiated updates by modifying the **isolation.tools.guestInitiatedUpgrade.disable** VM setting, which can be done easily to one or more VMs with PowerCLI:

### 5. Mass updates through PowerCLI automation

In very large environments or for those that have established more mature operational processes, PowerCLI provides a powerful option for updating VM Tools. This approach can target particular groups of VMs in many convenient ways, such as by cluster, by guest OS version, tags, VM state, or other vSphere attributes.



### 6. Native Linux package management processes

By nature of their design, Linux guests running OSPs or OVTs update VM Tools as part of a broader patching and updating workflow used for other components. This allows administrators to leverage existing Linux package managers or broader patch management and monitoring solutions without need to coordinate with vSphere administrators.

### 7. BONUS: VM Tools Upgrade Method (pun intended)

For advanced use cases where vSphere APIs are being used for deeper integration with other processes, consider the UpgradeTools\_Task for programmatic upgrades of VM Tools.

# Summary

With these flexible means of updating VM Tools, there is a suitable approach for any VMware datacenter, whether the requirement is centralized control, automation, delegation to app owners, or integration with existing patch management processes.

Article: https://blogs.vmware.com/vsphere/2016/03/six-methods-for-keeping-vm-tools-up-to-date.html

Date: 2018-10-29



# Blog: Automating Upgrade of VMware Tools and VM Compatibility

# Automating Upgrade of VMware Tools and VM Compatibility

Next up in our Automating your vSphere Upgrade blog series is your VMware Tools and VM Compatibility. Upgrading these both have different requirements so we will cover when and how you should upgrade your VMware Tools and VM compatibility in the below post.



Step 1: Platform Services Controller Step 2: vCenter Server

Step 4: VM Tools / Compatibility

Step 6: Virtual Distributed Switch

Step 3: Hypervisor - ESXi

Step 5: Storage - VMFS

# Upgrading VMware Tools

When it comes to keeping your VMware Tools up to date we have a few options but I will focus on two of my favorite methods. Keeping VMware tools up to date is very important as VMware includes drivers and tools to make sure your VM's run optimally with the latest features.

Eric Gray of our CPBU Technical Marketing Team covers a few considerations and methods in depth in the following blog post Six Methods for Keeping VM Tools Up to Date.

## Checking VMware Tools Compliance

Before we can start to update our VMware Tools it might be a good idea to understand which VMs in our environment are currently out of compliance, the easiest way to check if a VM if out of compliance is to view it via the vSphere Client and it will show you details such as the version and compliance.



🔂 VM01	ACTION	S ~			
Summary M	Ionitor	Configure	Permissions	Datastores	Networks
No. 21.42 - 24.42	N.	Guest OS: Compatibility: VMware Tools:	Microsoft Window ESXi 6.7 and later Running, version:1 More info	vs Server 2016 (64 (VM version 14) 10287 (Upgrade a	4-bit) vailable)
Launch Web Con Launch Remote C	sole Console	IP Addresses: Host:	169.254.247.169 View all 2 IP addr upg-esx-05.cpbu	esses .lab	
A newer ve	ersion of VM	ware Tools is av	ailable for this virt	ual machine	

However, since we are talking about automation lets show this another way using PowerCLI.

Using this PowerCLI one-liner we are able to see more information at scale, we can see that within our folder we actually have 3 VMs that are out of compliance. To remediate these to the latest version its actually quite simple with PowerCLI as well.

PS C:∖U	sers\dstamen> <mark>Conne</mark>	ct-VIServe	r upg-vcsa-01.cpbu.lab	^
Name		Port	User	
	a-01 cobu lab		 CDRU) detamen	
upg-vcs	a-or.cpbu.tab	445		
PS C:\U on={\$ Name To	sers\dstamen> <mark>Get-F</mark> config.tools.toolsv olsVersion ToolStatu	o <mark>lder</mark> -nam ersion}}, ( us	e Testing   Get-VM   % { get-view \$id }   select name, @{Name="ToolsVersion"; Expres @{ Name="ToolStatus"; Expression={\$Guest.ToolsVersionStatus}} Sort-Object Name	si
	10207			
VMUL VM02	10287 guestToo 10287 guestToo	IsNeedUpgr		
VM03	10287 guestToo	lsNeedUpgr	ade	
vm04	10305 guestToo	lsCurrent		
VM05	10305 guestToo	lsCurrent		

To make the information clearer on what needs an update we will use the same search only looking for VMs where ToolStatus is guestToolsNeedUpgrade. To do that we will use the following one-liner.



### Upgrading VMware Tools via PowerCLI

Now that we know which VMs need tools update we can actually go forth and upgrade tools. That is quite simple we can do this using the Update-Tools PowerCLI cmdlet. Using our existing one-liner from above we will just append Update-Tools to update the VMs with tools currently out of compliance.



DC C.\usanz\dataman, Cat Falder, and Tasting   Cat M   W ( ast day ( id ) lydens Okiest (	
PS C: (Users (dstamen) Get-Folder -name lesting   Get-VM   % { get-View 3id } [Where-Object {3Guest.ioolsv	ersionstatus - II
ke "guestToolsNeedUpgrade"} [select name, @{Name="ToolsVersion"; Expression={%config.tools.toolsversion}},	@4{ Name="ToolSt
atus"; Expression={\$Guest.ToolsVersionStatus}}  Update-Tools _NoReboot _VM {\$Name} -Verbose	
VERBOSE: 9/27/2018 8:54:09 AM Update-Tools Started execution	
VERBOSE: Performing operation "Update VMware Tools." on VM "VM03".	
VERBOSE: 9/27/2018 8:54:10 AM Update-Tools Finished execution	
VERBOSE: 9/27/2018 8:54:10 AM Update-Tools Started execution	
VERBOSE: Performing operation "Update VMware Tools." on VM "VM02".	
VERBOSE: 9/27/2018 8:54:10 AM Update-Tools Finished execution	
VERBOSE: 9/27/2018 8:54:10 AM Update-Tools Started execution	
VERBOSE: Performing operation "Update VMware Tools." on VM "VM01".	
VERBOSE: 9/27/2018 8:54:10 AM Update-Tools Finished execution	

You may have noticed that all the VMs had their updates kicked off at the same time and this may not be ideal, this is one way that the Update-Tools cmdlet works, however we can get around this by storing the VMs within a variable and then using a loop process them one at a time. This is definitely preferable as it will limit the impact to the environment.

PS C:\Users\dstamen> \$OutOfDateVMs = Get-Folder -name Testing   Get-VM   % { get-view \$id }  Where-Object {\$Guest.To ersionStatus -like "guestToolsNeedUngrade"}  select name, @{Name="ToolsVersion"; Expression={\$config.tools.toolsversion @{ Name="ToolStatus"; Expression={\$Guest.ToolsVersionStatus}}  Sort-Object Name PS C:\Users\dstamen> \$OutOfDateVMs	olsv n}},
Name ToolsVersion ToolStatus	
VM01 10287 guestToolsNeedUpgrade VM02 10287 guestToolsNeedUpgrade VM03 10287 guestToolsNeedUpgrade	
PS C:\Users\dstamen> ForEach (\$VM in \$OutOfDateVMs){Update-Tools -NoReboot -VM \$VM.Name -Verbose} VERBOSE: 9/27/2018 9:10:12 AM Update-Tools Started execution VERBOSE: 9/27/2018 9:10:12 AM Update-Tools Finished execution VERBOSE: 9/27/2018 9:10:12 AM Update-Tools Started execution VERBOSE: 9/27/2018 9:10:44 AM Update-Tools Started execution VERBOSE: 9/27/2018 9:10:44 AM Update-Tools Finished execution VERBOSE: 9/27/2018 9:10:44 AM Update-Tools Finished execution VERBOSE: 9/27/2018 9:11:19 AM Update-Tools Started execution VERBOSE: 9/27/2018 9:11:19 AM Update-Tools Started execution VERBOSE: 9/27/2018 9:11:19 AM Update-Tools Started execution VERBOSE: 9/27/2018 9:11:19 AM Update-Tools Finished execution	

Now our tools are up to date!

For more information on upgrading your VMware Tools via PowerCLI you can find more information here.

### Upgrading Tools Automatically on Reboot

Using VM options to keep VMware Tools up to date is also another method to automatically keep VMs up to date. Enabling the "Check and upgrade VMware Tools before each power on" advanced setting use to not be used because of the additional reboot it would cause for virtual machines. Keep in mind that with Windows Server 2016 VMware Tools no longer need a reboot on upgrade, it can be safe to enable this setting and have VMs stay up to date on every reboot. However this may not be applicable to all situations, so another recommendation would be to enable this for a lab environment or non-critical workloads.

The easy way to enable this option is to log into the vSphere Client, edit the VM settings and enable the setting.



# Edit Settings VM01

Virtual Hardware VM Options

General Options	VM Name: VM01					
VMware Remote Console Options	Lock the guest operating system when the last remote user disconnects					
Encryption	Expand for encryption settings					
Power management	Expand for power management settings					
VMware Tools						
Power Operations	<ul> <li>Power On / Resume VM</li> <li>Shut Down Guest (Default) </li> <li>Suspend (Default) </li> <li>Restart Guest (Default) </li> </ul>					
Tools Upgrades	Check and upgrade VMware Tools before each power on					
Time	Synchronize guest time with host					
Run VMware Tools Scripts	<ul> <li>✓ After powering on</li> <li>✓ After resuming</li> <li>✓ Before suspending</li> <li>✓ Before shutting down guest</li> </ul>					

After all this a post on automation, so lets see if we can find a way to use PowerCLI to modify the VM's setting so this gets easier when we have a large environment.



Here we can see which VMs have the automatic upgrade set and which ones are configured for manual. Utilizing a filter we can look for objects that are set for manual and then configure them to be set for upgradeAtPowerCycle

PS C:\Users\dstamen> \$ManualUpdateVMs = Get-Folder Testing|Get-VM|Get-View | Where-Object {}\_.Config.Tools.ToolsUpgradePolic y -like "manual"}|select name,@{N='ToolsUpgradePolicy';E={\$\_.Config.Tools.ToolsUpgradePolicy } PS C:\Users\dstamen> PS C:\Users\dstamen> Foreach (\$VM in (\$ManualUpdateVMs)) { >> \$VMConfig = Get-View -VIObject \$VM.Name >> \$VMConfig Spec = New-Object VMware.vim.virtualMachineConfigSpec >> \$vmConfigSpec.Tools = New-Object VMware.vim.ToolsConfigInfo >> \$vmConfigSpec.Tools.ToolsUpgradePolicy = "UpgradeAtPowerCycle" >> \$VMConfig.ReconfigVM(\$vmConfigSpec) >> }

If we do a final check we can see that all VMs are now set to **upgradeAtPowerCycle**.



Х

PS C:\Users\dstamen> Get-Folder dePolicy } }  Sort Name	Testing Get-VM Get-View	select name,@{N='	;E={3Config.Tools	.ToolsUpgra
Name ToolsUpgradePolicy				
VM01 upgradeAtPowerCycle VM02 upgradeAtPowerCycle VM03 upgradeAtPowerCycle				
VM04 upgradeAtPowerCycle VM05 upgradeAtPowerCycle				

# Upgrading VM Compatibility

When it comes to upgrading your VM Compatibility this is something that should be done with caution. Upgrading VM Compatibility aka VM Hardware is like pulling out the motherboard and replacing it with a new one, so this should only be done when features and functionality in a higher level are needed. Our current recommended level is Hardware Version 11 as it handles remediation from current security threats.

Prior to upgrading your VM Compatibility you should always make sure VMware Tools are up to date first as new drivers can be required for the new virtual hardware.

As I mentioned previously prior to upgrading your VM Compatibility I recommend taking a snapshot or a backup of the virtual machine in case a rollback is needed.

### Checking VM Compatibility Version

Its quite easy to see the current version of VM Compatibility via the vSphere Client, however when checking the current levels across our entire vCenter Server we may want to automate this Below you will find a quick and easy one-liner to identify the VMs and their current VM Compatibility version.



As we can see above a few VMs are currently running v14 which is compatible with vSphere 6.7 only. This was needed for us to take advantage of VBS and TPM security features.

Again, we should only upgrade VM Compatibility when additional functionality is needed.

### Upgrading VM Compatibility Version

We have identified a need to upgrade VM08 also to v14 to take advantage of Per-VM EVC so we can handle the automation of the VM compatibility upgrade. We can do this again quite easily with PowerCLI.

If you wish to do this via the vSphere Client my colleague Nigel Hickey covers this in his blog series here. However, we are talking automation here so lets jump into the quick script to accomplish this.

PS	C:\Users\dstamen> \$HardwareUpdateVMs = Get-Folder Testing   Get-VM VM08
ΡS	C:\Users\dstamen>
PS	C:\Users\dstamen> Foreach (\$VM in (\$HardwareUpdateVMs)) {
>>	<pre>\$vMConfig = Get-View -VIObject \$vM.Name</pre>
>>	<pre>\$vmConfigSpec = New-Object VMware.Vim.VirtualMachineConfigSpec</pre>
>>	\$vmConfigSpec.ScheduledHardwareUpgradeInfo = New-Object -TypeName VMware.Vim.ScheduledHardwareUpgradeInfo
>>	<pre>\$vmConfigSpec.ScheduledHardwareUpgradeInfo.UpgradePolicy = "always"</pre>
>>	\$vmConfigSpec.ScheduledHardwareUpgradeInfo.VersionKey = "vmx-14"
>>	<pre>\$VMConfig.ReconfigVM(\$vmConfigSpec)</pre>
>>	

This will not automatically upgrade the VM Compatibility, unlike VMware Tools this can not be done with the virtual machine Powered On. The next time the VM is rebooted it will be shutdown, the compatibility will be upgraded and then be powered back on.

More information on upgrading VM Compatibility can be found here.

# Conclusion

Automating your VMware Tools and VM Compatibility upgrades do not need to be hard, we have quite a few ways to help you with this and help this blog has helped educate you on some additional methods. For more information on Automating your vSphere Upgrade be sure to check out the full series here.

Article:

https://blogs.vmware.com/vsphere/2018/09/automating-upgrade-of-vmware-tools-and-vmware-compatibility.html

Date: 2018-10-29



# Blog: vSphere Upgrade Series Part 4: Upgrading VMware Tools and VM Compatibility vSphere Upgrade Series Part 4: Upgrading VMware Tools and VM Compatibility

Welcome back to the vSphere Upgrade Blog for the next piece of our Upgrade Journey. We began in **Part 1 of this blog series** by reviewing our prerequisites & compatibility, gathering our data. **In Part 2** we upgraded vCenter Server & migrated VUM from vSphere 6.0 Update3 to 6.7. **Part 3 guided us** through preparing vSphere Update Manager (VUM) by creating an Upgrade Baseline and using that baseline to remediate our vSphere 6.0 Update 3 ESXi hosts to vSphere 6.7.

In part 4 of the vSphere Upgrade Series we will cover Upgrading VMware Tools and VM Compatibility.



# vSphere Upgrade Process

VMware Tools and Virtual Machine Compatibility comes in at Step 4 when upgrading a vSphere environment. Although both of these components hold much value for virtual machines (VM) when upgraded, caution should always be at the forefront of upgrading the VM Compatibility version. I mention caution because upgrading the VM Compatibility version may not always be necessary to perform unless specific features are needed.

# Upgrading VMware Tools

Let's start with VMware Tools. VMware Tools is a set of services and modules that enable several features in VMware products for better management of, and seamless user interactions with, guests operating systems. Although a guest operating system can run without VMware Tools, we suggest to always run the latest version of VMware Tools in your guest operating systems to access the latest features and updates.

VMware Tools can be upgraded manually, via vSphere Update Manager, **PowerCLI**, or by configuring virtual machines to check and install newer versions of VMware Tools when they reboot. The guest OS checks the version of VMware Tools when you power on a Virtual Machine (VM). The status bar of the VM displays a message when a new version is available.

In my vSphere 6.7 lab environment I will be upgrading VMware Tools on a Windows 2012 server VM via the vSphere Client (HTML5) which is considered a manual upgrade. I will begin by logging into the vSphere Client and check the current version of VMware Tools running on my VM.

Step1: Click on the VM to be upgraded and then from the Summary tab review the version of VMware Tools.



vm vSphere Client Menu	V Q Search				С	?~	Administrator@V	SPHERE	
v csa-whiplash-00.cpbu.lab	Summary Monitor	2 ACTIONS	S ♥ Permissions	Datastores	Networks				
<ul> <li>Houston</li> <li>HOU</li> <li>esx-crate-05.cpbu.lab</li> <li>esx-crate-06.cpbu.lab</li> <li>esx-crate-07.cpbu.lab</li> <li>esx-crate-08.cpbu.lab</li> <li>f) (DO NOT USE)VCSA</li> <li>VCSA67</li> <li>Windows 2012</li> </ul>	Poweredware Launch Remote Console	Guest OS: Compatibility: VMware Tools: DNS Name: IP Addresses: Host:	Microsoft Wind ESXi 6.0 and lat Running, version More info Win2012-NH 169.254.196.157 View all 2 IP ad esx-crate-08.cp	ows Server 2012 eer (VM version 11 n:10287 (Upgrade dresses ubu.lab	64-bit) e available)				CPU USAGE O HZ MEMORY USAGE 81 MB STORAGE USAGE 4.14 GB
	A newer version of VI	Mware Tools is a	vailable for this vi	rtual machine.				Upgrad	de VMware Tools
	VM Hardware			~	Notes				^
	Related Objects			^	Edit Notes				
	Cluster	🔲 ноч			Custom Attri	ibutes	Value		^
	Networks		twork						*
	Storage	🗐 vsanDa	atastore						

### Recent Tasks Alarms

Step 2: Click More info to reveal additional information (optional), then click Upgrade VMware Tools to begin the process

vm vSphere Client Me	nu 🗸 🛛 📿 Search		C	? ~ Ad	Iministrator@VSPH	
<ul> <li>Vesa-whiplash-00.cpbu.lab</li> <li>Houston</li> <li>Houston</li> <li>Houston</li> <li>esx-crate-05.cpbu.lab</li> <li>esx-crate-06.cpbu.lab</li> <li>esx-crate-06.cpbu.lab</li> <li>esx-crate-08.cpbu.lab</li> <li>f) (DO NOT USE)VCSA</li> <li>VCSA67</li> <li>Windows 2012</li> </ul>	Windows 201 Summary Monitor  Summary Monitor  Launch Web Console Launch Remote Console () A newer version of V	ACTIONS ~       Configure     Permissions     Datastore       Guest OS:     Microsoft Windows 20       Compatibility:     ESXI 6.0 an       Windows 20       VMware Tools:     Win2012-Ni       IP Addresses:     169.254.196       View all 2 IP       Host:     esx-crate-O       Image:     View all 2 IP       Host:     Image:       Image:     Image:       Image:     Image:       Image:     Image:       Image:     View all 2 IP       Host:     Image:       Image:     Image:	Running 10287 (10.1.15) Upgrade available VMware Tools is ins newer version avail : MSI	stalled and supported able.	() d, but there is a	CPU USAGE O HZ MEMORY USAGE 81 MB STORAGE USAGE 4.14 GB
	VM Hardware	~	Notes			^
	Related Objects	n 🚺 Hou	Edit Notes Custom Attr	ibutes		^
	Host	esx-crate-08.cpbu.lab	Attribute		Value	A
	Storage	vsanDatastore				

Step 3: Once you click Upgrade VMware Tools, you will be presented with 2 types of upgrades. Choose an upgrade type, click **Upgrade** to continue. (In my scenario, I have selected an Automatic Upgrade)

- An Interactive Upgrade allows the disk image for VMware Tools to be mounted to the guest OS. This allows the admin doing the work to console into the VM to run the install wizard.
- An Automatic Upgrade does what it implies by automatically upgrading VMware Tools without interacting with the guest OS. It also allows the guest OS to reboot automatically if needed.

nware © VMware LLC. by Broadcom

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Step 4: Review the Recent Tasks pane to monitor the VMware Tools upgrade progress

vm vSphere Client Meni	u 🗸 🛛 📿 Search			C	?~	Administrator@VSPHE	RE.LOCAL V	٢
	🚯 Windows 2012	ACTIONS -						
<ul> <li>Vcsa-whiplash-00.cpbu.lab</li> <li>Houston</li> <li>HOU</li> <li>esx-crate-05.cpbu.lab</li> <li>esx-crate-06.cpbu.lab</li> <li>esx-crate-06.cpbu.lab</li> <li>esx-crate-08.cpbu.lab</li> <li>esx-crate-08.cpbu.lab</li> <li>f) (DO NOT USE) VCSA</li> <li>VCSA67</li> </ul>	Summary Monitor Co Co Co VM POL Cecenter Launch Web Console Launch Remote Console	est OS: Microsoft Wi mpatibility: ESX (6.0 and fware Tools: Running, vers More Info IS Name: Win2012-NH Addresses: 169-254.196.1 View all 2 IP ; st: esx-crate-08	Datastores ndows Server 2012 ( later (VM version 11) sion:10287 (Upgrade 57 addresses .cpbu.lab	Networks 64-bit) available)			CPU USAGE O HZ MEMORY USAGE 81 MB STORAGE USAG 4.14 GB	E
🔓 Windows 2012	A newer version of VMwar	re Tools is available for this	s virtual machine.			Ups	rade VMware Tools	
	VM Hardware		~	Notes Edit Notes			^	Ţ
Recent Tasks Alarms								*
Task Name 🗸 Target	✓ Status ↑ ✓	Initiator ~	Queued For	✓ Start Time	~	Completion Time ~	Server	~
Initiated VMware Tools Install or upgrade	0% 🛞	VSPHERE.LOCAL\Ad	undefined	08/09/2018, 3 PM	07:24		vcsa-whiplash-00.cp	b
Query esx-crate-0	5.cpb 🗸 Completed	com.vmware.vsan.he	8 ms	08/09/2018, 3 PM	04:29	08/09/2018, 3:04:29 PM	vcsa-whiplash-00.cp	b
	Completed	comumularoucan bo	A me	08/09/2018, 3	04:28	08/09/2018, 3:04:29	voca whiplach 00 cp More	Tasks

**Step 5:** Once the upgrade is complete, we verify the upgrade by clicking More info to display VMware Tools' version & status.



vm vSphere Client Met	nu 🗸 🛛 🔍 Search		С	@~	Administrator@VSF	
	🚯 Windows 2012	ACTIONS ~				
<ul> <li>vcsa-whiplash-00.cpbu.lab</li> <li>Houston</li> <li>HOU</li> <li>esx-crate-05.cpbu.lab</li> <li>esx-crate-06.cpbu.lab</li> <li>esx-crate-07.cpbu.lab</li> <li>esx-crate-08.cpbu.lab</li> <li>(DO NOT USE)VCSA</li> <li>VCSA67</li> <li>Windows 2012</li> </ul>	Summary Monitor C Gu CC VV M Powered On IP Launch Web Console Launch Remote Console	tonfigure Permissions Datastore	s Networks	installed and the t	★	CPU USAGE 109 MHz MEMORY USAGE 573 MB STORAGE USAGE 4.14 GB
	VM Hardware	~	Notes Edit Notes			^
1	Related Objects	~	Custom At	tributes		
Recent Tasks Alarms		Fluer	Custom A			*
Task Name V Target	Status ~	Initiator V Queued For	✓ Start Tim	ie↓ ~	Completion Time	✓ Server ✓
Initiated VMware Tools Install or upgrade	2012 ✓ Completed	VSPHERE.LOCAL\Ad 6 ms	08/09/2 PM	018, 3:07:24	08/09/2018, 3:09:04 PM	vcsa-whiplash-00.cpb
Query esx-crate-	05.cpb ✓ Completed	com.vmware.vsan.he 8 ms	08/09/2 PM	018, 3:04:29	08/09/2018, 3:04:29 PM	vcsa-whiplash-00.cpb
	07cph Completed	comumularouran bo d.mc	08/09/2	018, 3:04:28	08/09/2018, 3:04:29	More Tasks

# Upgrading VMware Tools with PowerCLI

VMware Tools updates can also be performed via PowerCLI. The cmdlet "*Update-Tools*" can be used to upgrade the VMware Tools on the specified virtual machine guest OS. VMware Tools must be installed prior to updating it. After VMware Tools is updated, the virtual machine is restarted unless the NoReboot parameter is specified.

An example usage is shown below that can update VMware Tools on a virtual machine specified by its guest operating system.

Example scripts for VMware Tools Management can also be found on our VMware GitHub pages.

# Upgrading Virtual Machine Compatibility

Now we will review Virtual Machine Compatibility. Virtual machine compatibility determines the virtual hardware available to the VM, which corresponds to the physical hardware available on the vSphere host. Upgrading the compatibility level will allow the VM to take advantage of additional hardware features available to the virtual machine.

In vSphere 6.7, Virtual Machine Compatibility (Virtual Hardware Version) 14 was introduced. VM Compatibility version 14 includes support for features such as; Per-VM EVC, Virtual TPM 2.0, and Microsoft Virtualization Based Security (VBS). Note that when upgrading VM Compatibility some applications or the OS to may have issues working properly. I suggest only upgrading VM Compatibility if you require a feature that comes with the newer hardware version.

In my lab example I will upgrade VM Compatibility from version 11 (ESXi 6.0 and later) to version 14 (ESXi 6.7 and later) via vSphere Client (HTML5).

**Step 1:** Right click on the VM to be upgraded (or use the *Actions* menu once the VM is highlighted), choose **Compatibility** and then click **Schedule VM Compatibility Upgrade**.





**Step 2:** Read the next window to understand what a VM Compatibility Upgrade will do. When ready, click **Yes** to continue.



**Step 3:** Choose the VM Compatibility version desired (example: *ESXi 6.5 and later* or *ESXi 6.7 and later*). You may also choose to only upgrade after a normal OS shutdown versus when an OS crashes then reboots.





**Step 4:** Next we can review the status of the upgrade. When VM Compatibility is scheduled to be upgraded, you will notice the status of the upgrade is viewable under the **VM Hardware** section of the virtual machine.

vm vSphere Client	Menu 🗸 🛛 📿 Search		C @~	Administrator@VSPHERE.LOCAL ∨	٢	
<ul> <li>vcsa-whiplash-00.cpbu.lab</li> <li>Houston</li> <li>HOU</li> <li>esx-crate-05.cpbu.l.</li> <li>esx-crate-06.cpbu.l.</li> </ul>	Windows 2012 Summary Monitor Launch Remote Console	ACTIONS - Configure Permissions Datastores Host: esx-crate-08.cpbu.lab	Networks		A	
esx-crate-07.cpbu.l	VM Hardware	^	Notes		^	
(DO NOT USE)VCS	> CPU	1 CPU(s)	Edit Notes			
VCSA67	> Memory	4 GB, 0.12 GB memory active	Custom Attributos			
🕞 Windows 2012	> Hard disk 1	40 GB	Custom Attributes			
	> Network adapter 1	VM Network (connected)	vSphere HA		~	
	> CD/DVD drive 1	Connected				
	> Video card	4 MB				
	VMCI device	Device on the virtual machine PCI bus that provides support for the virtual machine communication interface				
	> Other	Additional Hardware				
	Compatibility	ESXi 6.0 and later (VM version 11) (pending upgrade)			Ţ	

Recent Tasks Alarms

**Step 5:** Once a VM Compatibility upgrade has completed, it can be verified by checking the status under the **VM** *Hardware* section of the virtual machine.





# Conclusion

As you have witnessed updating VMware Tools or Virtual Machine Compatibility are not complex tasks, but absolutely include steps that will require consideration prior to execution. It is always best to consult VMware Documentation pages for further details on VMware Tools as well as Virtual Machine Compatibility prior to upgrading. Also be sure to review the vSphere Upgrade Guide.

In the next **vSphere Upgrade Series** post, we will focus on upgrading **Upgrading VMFS Storage** in a vSphere 6.7 environment. Please do not hesitate to post questions in the comments section of this blog or reach out to me directly via Twitter @vCenterNerd.

In part 1 of the vSphere Upgrade Series, **Preparing to Upgrade**, we covered getting started with our prerequisites, compatibility, and also prepared the vSphere Update Manager (VUM) server to migrate its data to the VCSA 6.7 during the upgrade. In part 2 we will cover the vCenter Server Upgrade to 6.7. Let's begin.

# vCenter Server Upgrade

Now that VUM has passed its Migration Assistant pre-checks, we can move to the vCenter Server Upgrade. I am also assuming here that you have a backup of the vCenter Server prior to upgrading.

We begin by mounting the VCSA installation ISO to an Admin workstation that is on a routable network to the vCenter Server we will be upgrading. Browse the ISO and open the "**vcsa-ui-installer**" folder then the corresponding folder for your OS. I am running this from a Windows system so I will open the "**win32**" folder.



Appli	cation Tools win32			- 🗆 ×
File Home Share View	lanage			~ 😮
← → ∽ ↑ 📙 « DVD Drive (E:) VMware	VCSA > vcsa-ui-insta	eller > win32	✓ Ö Search win32	م
Name	Date modified	Туре	Size	
locales	4/9/2018 4:39 PM	File folder		
resources	4/9/2018 4:39 PM	File folder		
blink_image_resources_200_percent.pak	2/9/2018 3:32 PM	PAK File	25 KB	
content_resources_200_percent.pak	2/9/2018 3:32 PM	PAK File	1 KB	
📄 content_shell.pak	2/9/2018 3:32 PM	PAK File	9,882 KB	
d3dcompiler_47.dll	2/9/2018 3:32 PM	Application extens	3,386 KB	
🚳 ffmpeg.dll	2/9/2018 3:32 PM	Application extens	1,849 KB	
📄 icudtl.dat	2/9/2018 3:32 PM	DAT File	9,894 KB	
🕝 installer.exe	2/9/2018 3:32 PM	Application	55,547 KB	
🚳 libEGL.dll	2/9/2018 3:32 PM	Application extens	94 KB	
libGLESv2.dll	2/9/2018 3:32 PM	Application extens	1,893 KB	
LICENSE	2/9/2018 3:32 PM	File	2 KB	
CLICENSES.chromium.html	2/9/2018 3:32 PM	Chrome HTML Do	1,702 KB	
natives_blob.bin	2/9/2018 3:32 PM	BIN File	335 KB	
🚳 node.dll	2/9/2018 3:32 PM	Application extens	14,693 KB	
📄 snapshot_blob.bin	2/9/2018 3:32 PM	BIN File	795 KB	
ui_resources_200_percent.pak	2/9/2018 3:32 PM	PAK File	85 KB	
🗋 version	2/9/2018 3:32 PM	File	1 KB	
views_resources_200_percent.pak	2/9/2018 3:32 PM	PAK File	59 KB	
🗟 xinput1_3.dll	2/9/2018 3:32 PM	Application extens	80 KB	
20 items 1 item selected 54.2 MB				

Next run the application "installer.exe" with Administrator Rights. This will launch the vCenter Server Appliance Installer to begin Stage 1.

NOTE: The upgrade of the vCenter Server is broken up into two stages, Stage 1 & Stage 2. Stage 1 is the deployment of a new VCSA and Stage 2 is where all of the configuration data and inventory are imported into the newly upgraded vCenter Server. Begin by clicking **Upgrade**.





# Stage 1

**Step 1:** This is the introduction and an explanation of the two Stages of the Upgrade. Click **Next** to continue.

VCenter Server Appliance Installer Installer		- 0 ×
vm Upgrade - Stage 1: Deploy appl	iance	
1       Introduction         2       End user license agreement         3       Connect to source appliance         4       Appliance deployment target         5       Set up target appliance VM         6       Select deployment size         7       Select datastore         8       Configure network settings         9       Ready to complete stage 1	Introduction This installer allows you to upgrade vCenter Server Appliance ( Stage 1	6.0 or 6.5), or Platform Services Controller 6.0 or 6.5 to version 6.7. Stage 2
		CANCEL

**Step 2:** Review the EULA, check the box to accept the terms of the license agreement, and then click **Next** to continue.



٥ vCenter Server Appliance Installer  $\times$ staller vm Upgrade - Stage 1: Deploy appliance End user license agreement 1 Introduction Read and accept the following license agreement 2 End user license agreement VMWARE END USER LICENSE AGREEMENT 3 Connect to source appliance PLEASE NOTE THAT THE TERMS OF THIS END USER LICENSE AGREEMENT SHALL GOVERN YOUR USE OF THE SOFTWARE, REGARDLESS OF ANY TERMS THAT MAY APPEAR DURING THE INSTALLATION OF THE SOFTWARE. 4 Appliance deployment target IMPORTANT-READ CAREFULLY: BY DOWNLOADING, INSTALLING, OR USING THE SOFTWARE, YOU (THE INDIVIDUAL OR LEGAL ENTITY) AGREE TO BE BOUND BY THE TERMS OF THIS END USER LICENSE AGREEMENT ("EULA"). IF YOU DO NOT AGREE TO THE TERMS OF THIS EULA, YOU MUST NOT DOWNLOAD, INSTALL, OR USE THE SOFTWARE, AND YOU MUST DELETE OR RETURN THE UNUSED SOFTWARE TO THE VENDOR FROM WHICH YOU ACQUIRED IT WITHIN THIRTY (30) DAYS AND REQUEST A REFUND 5 Set up target appliance VM 6 Select deployment size OF THE LICENSE FEE, IF ANY, THAT YOU PAID FOR THE SOFTWARE. EVALUATION LICENSE. If You are licensing the Software for evaluation purposes, Your use of the Software is only permitted in a 7 Select datastore non-production environment and for the period limited by the License Key. Notwithstanding any other provision in this EULA, an Evaluation License of the Software is provided "AS-IS" without indemnification, support or warranty of any kind, expressed or 8 Configure network settings implied. 9 Ready to complete stage 1 I accept the terms of the license agreement. CANCEL BACK

**Step 3a:** Enter the source vCenter Server that you will be Upgrading by its **FQDN** or **IP address**. Click **Connect To Source** to reveal the additional fields.

🛃 vCe Installe	nter Server Appliance Installer r				-	٥	×
v	n Upgrade - Stage 1: Deploy appli	ance					
	1 Introduction 2 End user license agreement	Connect to source applia Provide the details for the source applia	NCE ance that you want to upgrade: vCenter Server or F	Natform Services Controller.			
	3 Connect to source appliance	Source appliance Appliance FQDN or IP address	vcsa-whiplash-00.cpbu.lab	١			
	<ol> <li>Appliance deployment target</li> <li>Set up target appliance VM</li> </ol>	Appliance HTTPS port					
	6 Select deployment size						
	7 Select datastore						
	8 Configure network settings 9 Ready to complete stage 1						
				CANCEL	<	NEXT	

**Step 3b:** Complete each required field for SSO as well as the information about the ESXi host that manages the source vCenter Server. Then click **Next** to continue.



🚱 vCenter Server Appliance Installer Installer			-	٥	×
vm Upgrade - Stage 1: Deploy appl	liance				
1 Introduction 2 End user license agreement	Connect to source appliance Provide the details for the source appliance the	hat you want to upgrade: vCenter Server or Platform Services Co	ntroller.		
3 Connect to source appliance	Source appliance Appliance FQDN or IP address	vcsa-whiplash-00.cpbu.lab	í		
4 Appliance deployment target	Appliance HTTPS port	443	í		
5 Set up target appliance VM	SSO Liser name	connect to source			
6 Select deployment size	SSO Password				
7 Select datastore	Appliance (OS) root password				
8 Configure network settings	ESXi host or vCenter Server that manages the	e source appliance	-		
9 Ready to complete stage 1	ESXi host or vCenter Server name	esx-crate-05.cpbu.lab 443	(i)		1
	User name	root			
	Password				-
		CANCE	ВАСК	NEXT	

**Step 3c:** You will prompted to verify the SSL Certificates. Review and click **Yes** to continue.

Certificate Warning
If an untrusted SSL certificate is installed on vcsa-whiplash-01.cpbu.lab or esx- crate-01.cpbu.lab, secure communication cannot be guaranteed. Depending on your security policy, this issue might not represent a security concern.
The SHA1 thumbprints of the certificates are:
07:D1:39:39:76:83:42:68:0E:A6:A6:2B:7D:32:7C:7A:57:48:39:3D
and
52:52:BD:5D:C2:62:33:7F:19:10:7D:45:0F:61:96:B4:A2:F0:1E:1C
To accept and continue, click Yes
NO

**Step 4a:** Specify the target host or vCenter Server to which the new VCSA will be deployed to. Click **Next** to continue.

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🕼 vCenter Server Appliance Installer Installer			- 0 ×			
vm Upgrade - Stage 1: Deploy vCe	nter Server with an Embedded Platform	Services Controller				
1 Introduction	Appliance deployment targe	et				
2 End user license agreement	Specify the appliance deployment target so deployed.	ettings. The target is the ESXi host or vCenter Server instance on whic	ch the appliance will be			
3 Connect to source appliance	ESXi host or vCenter Server name	esx-crate-05.cpbu.lab	(i)			
4 Appliance deployment target	HTTPS port	443	_ •			
5 Set up target appliance VM	User name	root	- (j)			
6 Select deployment size	Password		_ 👻			
7 Select datastore						
8 Configure network settings						
9 Ready to complete stage 1						
		CANCEL	BACK			
Step 4b: When prompted, r	eview the SSL Certificate and	d thumbprints then click <b>Yes</b> to continue.				
Cortificato V	Varning					
	varning		_			
If an untructed SSI	cortificato is installed	on asy-croto-01 cobulab, socura	_			
	poet be guaranteed.	on esx-crate-oncopoulab, secure	hic			
communication ca	nnot be guaranteed. De	epending on your security policy, th	nis			
issue might not re	present a security conc	ern.	_			
The SHA1 thumbpi	rint of the certificate is:		_			
52:52:BD:5D:C2:62	2:33:7F:19:10:7D:45:0F:6	1:96:B4:A2:F0:1E:1C				
To accept and con	itinue, click Yes					

**Step 5:** Specify the Virtual Machine name (this is only the Inventory name) and set the password for the VCSA that will be deployed during the upgrade. Click **Next** to continue.

NOTE: During an upgrade of the source VCSA, a new VCSA virtual machine is deployed and configurations are imported to the new vCenter Server Appliance. The source VCSA will be powered off and should be either removed from inventory, or have its network adapter DEACTIVATED after the upgrade completes.

with Ware C VMware LLC.

YES

NO

🛃 v Inst	'Cente aller	er Server Appliance Installer					-	٥	×
	vm	Upgrade - Stage 1: Deploy vCen	ter Server with an Embedded Platform Se	rvices Controller					
	1	Introduction End user license agreement	Set up target appliance VM	e deployed.					
	3	Connect to source appliance	VM name	VCSA67		í			
	4	Appliance deployment target	Set root password			í			
	5	Set up target appliance VM	Confirm root password			_			
	6	Select deployment size							
	7	Select datastore							
	8	Configure network settings							
	9	Ready to complete stage 1							
					CANCEL	BACK		NEXT	

**Step 6:** Select the deployment size for the vCenter Server. If more storage is needed than the default sizing, choose the "**Storage Size**" dropdown for more choices. Storage size changes will be reflected in the table below the selection dropdown in the **Storage (GB)** column.

It may be necessary to edit the storage size from **Default** to *Large* or *X-Large* if importing the optional Historical & Performance Data (see image for more details).

**NOTE:** If you plan to use vCenter High Availability (VCHA) after you upgrade your vCenter Server, the smallest deployment size supported for VCHA is Small. Click Next to continue.

🕝 vCenter Server Appliance Installer Installer							-	٥	×
vm Upgrade - Stage 1: Deploy vCer	nter Server with an Embed	ded Platfo	orm Services Co	ontroller					
1 Introduction	Select deploymer	it size							
2 End user license agreement	For more information on depl	oyment size	es, refer to the vSph	ere 6.7 documenta	tion.				
3 Connect to source appliance	Deployment size		Tiny			~	í		
4 Appliance deployment target	Storage size Default ~						í		
5 Set up target appliance VM	Resources required for different deployment sizes			Increase the storage size, if you want a larger VMDK allocated to the SEAT		9			
6 Select deployment size	Deployment Size	vCPUs	Memory (GB)	Storage (GB)	(stats, events, ala	rms, tasks) partition.			- 1
7 Select datastore	Source machine			178	4	1			- 1
, select datastore	Tiny	2	10	300	10	100			- 1
8 Configure network settings	Small	4	16	340	100	1000			- 1
9 Ready to complete stage 1	Medium	8	24	525	400	4000			- 1
	Large	16	32	740	1000	10000			- 1
	X-Large	24	48	1180	2000	35000			- 1
									*
						CANCEL	BACK	NEX	т

**Step 7:** Select the datastore location for the vCenter Server Appliance. The option to also Enable Thin Disk Mode is available, if you require it.

Click Next to continue.



vCenter Server Appliance Installer Installer	-	٥	×
vm Upgrade - Stage 1: Deploy vCen	ter Server with an Embedded Platform Services Controller		
1 Introduction 2 End user license agreement	Select datastore Select the storage location for this appliance		
3 Connect to source appliance 4 Appliance deployment target 5 Cot up toget appliance 104	Name         Y         Type         Y         Capacity         Y         Free         Y         Provisioned         Y         Thin Provisioning           vsanDatastore         vsan         766.24 GB         729.83 GB         36.41 GB         Supported	T	
<ol> <li>Set up target appliance VM</li> <li>Select deployment size</li> <li>Select datastore</li> </ol>	✓ Enable Thin Disk Mode ①	1 item	
8 Configure network settings 9 Ready to complete stage 1			
	CANCEL BACK	NEXT	

**Step 8:** Configure the temporary network settings that are required to deploy the new VCSA. Be sure to add at least 1 DNS server. Once all required fields are completed, click **Next** to continue.

G vCenter Server Appliance Installer – O X Installer						×	
vr	n Upgrade - Stage 1: Deploy vCen	iter Server with an Embedded Platform Se	ervices Controller				
	1 Introduction 2 End user license agreement	Configure network settings Configure network settings for this appliance					Î
	3 Connect to source appliance	Network	VM Network	~ (ì			
	4 Appliance deployment target	Temporary network settings					
	5 Set up target appliance VM	IP version	IPv4	<u> </u>			
	6 Select deployment size	IP assignment	static	<u> </u>			
	7 Select datastore	Temporary IP address	10.196.180.199				
	8 Configure network settings	Subnet mask or prefix length	255.255.255.0	í			
	9 Ready to complete stage 1	Default gateway	10.196.180.253				
		DNS servers	10.172.212.5, 10.172.212.6				
							-
			CANCE	L BA	ск	NEXT	

**Step 9:** Review all settings of Stage 1 prior to Upgrade. Once verified, click **Finish** to continue and kick off Stage 1 of the vCenter Server Upgrade.



🕼 vCenter Server Appliance Installer — ( Installer					٥	×
	vm Upgrade - Stage 1: Deploy vCente	r Server with an Embedded Platform Services	Controller			
	1 Introduction	Ready to complete stage 1				
		Target ESXi host	esx-crate-05.cpbu.lab			^
	2 End user license agreement	VM name	VCSA67			
	3 Connect to source appliance	Deployment type	vCenter Server with an Embedded Platform Services Controller			1
	4 Appliance deployment target	Deployment size	Tiny			
	5. Set up target appliance VM	Storage size	Default			
	o set up target appliance vin	<ul> <li>Datastore Details</li> </ul>				
	6 Select deployment size	Datastore, Disk mode	vsanDatastore, thin			
	7 Select datastore	√ vSAN details				
	8 Configure network settings	Datacenter Name	vSAN Datacenter			
		Cluster Name	vSAN Cluster			1
	9 Ready to complete stage 1	Deduplication and compression	Disabled			
		V Network Details				
		Network	VM Network			-
			CANCEL	к	FINISH	4

Stage 1 of deploying the new vCenter Server Appliance is now underway.

🛃 vCenter	r Server Appliance Installer			– 0 ×
Installer				
	(my)			
	Upgrade - Stage 1: Deplo	y vCenter Server with an Er	mbedded Platform Services Co	ontroller
	Deploying the appliance			71%
				CANCEL
	Appliance or Platform Services Controller	Server Appliance or Platform Services Controller Appliance	Server or Platform Services Controller or Single Sign-On gerver for Windows to Appliance	vCenter Server Appliance or Platform Services Controller Appliance backup
_				

Once the VCSA is deployed and all RPM installs are completed in Stage 1, you can click **Continue** to move on to Stage 2.





# Stage 2

Stage 2 of the upgrade is when the data from the source vCenter Server as well as vSphere Update Manager (VUM) is imported into the newly deployed VCSA.

Step 1: Review the details of the Stage 2 process and then Click Next to continue.

VCenter Server Appliance Installer				– ø ×
Installer				
	vm Upgrade - Stage 2: vCenter	Server Appliance with an Embedded PSC		
E	Introduction           2         Connect to source vCenter Se	Introduction This wizard allows you to upgrade a vCenter Se embedded Platform Services Controller.	erver Appliance (6.0 or 6.5) with an	Å
	<ol> <li>Select upgrade data</li> <li>Configure CEIP</li> </ol>	Stage 1	Stage 2	
Configure th VCr	5 Ready to complete	2		e guration, y data from a ance backup.
		Deploy new vCenter Server Appliance	Upgrade source vCenter Server Appliance	
		Upgrading the appliance is a two stage process The second stage copies data from the source deployed appliance. Make sure you have backe before progressing with the upgrade process.	s. The first stage has been completed. vCenter Server Appliance to the ed up all data on the source appliance Click Next, to proceed with stage 2.	
Copyright (8: 1998-2018 VM-v) VM-vare b, a registered trader source software components			CANCEL	nvrare.com/go/patents . i may contan individual open

This will kick off a series of pre-checks on the source vCenter Server.





**Step 2:** Once pre-checks have completed, results will be shown on screen. Review any warnings given, as well as the resolutions to these warnings. In my upgrade scenario I had a few warnings, one reminding me to change DRS which we did before we began, and others that I validated were ok to proceed in this situation.

Review and click **Close** to continue.

🗿 vCenter Server Appliance Installe	er					- 6	i ×
Installer							
		oduc	Soloci	tungrado data	122		
		nnec Pre-u	upgrade check re	sult	o target		
		nfigu	Warning	This ESXi host [esx-crate-05.cpbu.lab] is managed by vCenter Server [10.196.180.210].	changed.		
		ady t	Resolution	Make sure the cluster where this ESXi host resides is not set to Fully Automated DRS for the duration of the upgrade process.			
		4	Warning Resolution	User vdcs does not have the expected uid 1006 Please refer to the corresponding KB article.	(2.88 GB)		
		4	Warning	The source vCenter Server instance is configured with more CPU cores than the target appliance.			
		_		CLOS			
					BACK		i Alapan

**Step 3:** Select the data that you will require to be imported. The Inventory & Configuration data is moved by default, any historical data (events, tasks, performance, etc) is optional to import. This is offered to shorten the upgrade and migration of data into the new VCSA. Make the required choice, and then click **Next** to continue.





**Step 4:** Join the VMware Customer Experience Improvement Program or CEIP. Joining this program is optional but when you do join, it helps VMware to improve our products and services, fix problems and advise you on how best to deploy and use our products. CEIP is also required to enable the vSAN health check services.

To understand this better, please review additional information regarding the CEIP and its purpose.

Once a choice has been made, click **Next** to continue.

SvCenter Server Appliance Instal	er vm Upgrade - Stage 2: vCenter S	Server Appliance with an Embedded PSC	- 0 ×
Configure th VC	<ol> <li>Introduction</li> <li>Connect to source vCenter Se</li> <li>Select upgrade data</li> <li>Configure CEIP</li> <li>Ready to complete</li> </ol>	Configure CEIP Join the VMware Customer Experience Improvement Program VMware's Customer Experience Improvement Program ("CEIP") provides YMware with information that enables VMware to improve its products and services, to fix problems, and to advise you on how best to deploy and use our progranization's use of VMware products and services on a regular basis in association with your organization's VMware license key(s). This information does not personally identify any individual. Additional information regarding the data collected through CEIP and the purposes for which it is used by VMware is set forth in the Trust & Assurance Center at http://www.mware.com/trustmware/ceip.html. If you prefer not to participate in VMware's CEIP for this product, you should uncheck the box below. You may join or leave VMware's CEIP for this product at any time.	e guration, r data from a ance backup.
Copyright (2) 1010-2018 Wess Welvars is a neglistered table searcy software components		Join the VMware's Customer Experience Improvement Program (CEIP)	novane comigo/patenta 

Step 5: Review all setting choices here and once complete, click Finish to continue.







Click $\boldsymbol{OK}$ to conti	nue.			
VCenter Server Appliance Instal	ler			- 0 ×
Installer	vm Upgrade - Stage 2: vCente	er Server Appliance with an Embedded PSC		
Configure In . Vio	1       Introduction         2       Connect to source vCenter Set         3       Select upgrade data         4       Configure CEIP       Sht         5       Ready to complete	Ready to complete Review settings before completing the wizard. Source vCenter Server Appliance with embedded PSC utdown Warning The source vCenter will be shut down once the network configuration is enabled on destination vCenter Server. Click OK to continue, or Cancel to stop the upgrade.	ilab ilab	Pe guration, videa from a since backup.
		CANCEL OK CEIP setting Opted in		
Copyright & 1995, 2010 when Millions is a registered leader source software comprised.		I have backed up the source vCenter Server and all t database.	CANCEL BACK FINISH	wate control polpatents may contain individual open

Stage 2 begins. Data is exported from the source vCenter Server and prepared for import.





Next, vCenter Server services are started on the destination VCSA.

Scenter Server Appliance Installer

Installer				
		Upgrade - Stage 2: D	ata transfer and appliance setup is in progress	
	ĺ	0	1. Copy data from source vCenter Server to target vCenter Server	
		C	2. Set up target vCenter Server and start services 52% Starting VMware vCenter-Services	
	Cantolina		3. Import copied data to target vCenter Server	9
	vC			data from a nce backup.
	D 1998-2018 VMv a registered trade tware components,	each of which has its own copyright and applica	ble license conditions. Sen http://www.mbrate.com/int/31d=1127 for more information.	ware.com/go/patents . way confain individual open

Last, the copied data from the source vCenter Server is imported to the destination VCSA.



o ×



When all data has been imported to the destination VCSA, the process is complete. Messages are presented at this step as informational, such as a notice about TLS changes in vSphere 6.7.

Review these notices then click **Close** to continue.

VCenter Server Appliance Installer Installer					- 0 ×
	pgrade - Stage 2	: Complete			
	Messa	ges			
	i	Information	If using Auto Deploy, update the DHCP settings and update the TFTP settings with the new set of tramp files from the new Auto Deploy server.		
	í	Information	vSphere 6.7 disables the TLS 1.0 and TLS 1.1 protocols for improved security. Note: Some applications might support only the older protocols. To revert to the less secure TLS 1.0 and TLS 1.1 protocols, run the TLS Reconfigurator to Tool location: vCenter Server Appliance: /usr/lib/vmware- TIsReconfigurator/VCTIsReconfigurator vCenter Server on Windows: %VMWARE_CIS_HOME%\TIsReconfigurator\VCTIsReconf See https://kb.vmware.com/kb/2147469 for details.	igur •	B Brestlers, Bitete from n RCel Batchao.
				CLOSE	

Stage 2 of the vCenter Server Upgrade is now completed.

Click **Close** to continue.



٥ vCenter Server Appliance Installer × \_ Installer Upgrade - Stage 2: Complete 1. Copy data from source vCenter Server to target vCenter Server Ø 2. Set up target vCenter Server and start services 3. Import copied data to target vCenter Server 100% Complete Data transfer and appliance setup has been completed successfully. Click on the link below to get started. Press close to exit. Appliance Getting Started https://vcsa-whiplash-00.cpbu.lab:443 Page

Closing the installer will launch the vCenter Server splash page allowing you to login via the vSphere Client on HTML5.

Since the vSphere Web Client (Flex) is now deprecated, I will use the HTML5 vSphere Client because it is now our default client and it contains 95% of all workflows as compared to vSphere 6.5 Update 1 that contained 90% of workflows. The HTML5 vSphere Client will be fully featured by the Fall of 2018.

Click the button "Launch vSphere Client (HTML5)" to continue.

Getting Started       For Administ         LAUNCH VSPHERE CLIENT (HTML5)       Web-Based         LAUNCH VSPHERE WEB CLIENT (FLEX)       Use your well         Documentation       For Develop         VMware vSphere Documentation Center       For Develop         Functionality Updates for the vSphere Client (HTML5)       Learn about the managing VM sample code         our Forum Diagonality Updates for the vSphere Client (HTML5)       Browse of         Browse of       Browse of         Browse of       Browse of         Documentation Center       Learn about the sample code         Functionality Updates for the vSphere Client (HTML5)       Learn about the sample code         Browse of       Browse of         Browse of       Browse of	
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Enter the administrator credentials (SSO administrator or other administrator with access to vSphere) and login to view the vCenter Server and hosts.



<b>vm</b> ware <sup>.</sup>		
User name:: Password:	administrator@vsphere.local	VMware° vCenter~ Single Sign-On
Download Enhanced Au	thentication Plugin	

Now we will verify the vCenter Server is now running on version 6.7. We do this by clicking on the inventory name of the vCenter Server and viewing the **Version Information** from the **Summary** tab.

vm vSphere Client Menu		C	? ∽ Admi	inistrator@VSPHERE.LOCAL ∨	
	Vcsa-whiplash-01.cpbu.lab				
<ul> <li>Vcsa-whiplash-01.cpbu.lab</li> <li>Houston</li> <li>HOU</li> <li>esx-crate-01.cpbu.lab</li> <li>esx-crate-02.cpbu.lab</li> <li>esx-crate-04.cpbu.lab</li> <li>server2016</li> <li>VCSA-WHIPLASH-01</li> <li>VCSA67</li> <li>VUM60</li> <li>Win10</li> </ul>	Summary Monitor Configure Permissions D Virtual Machines: 5 Hosts: 4	atacenters Hosts &	a Clusters VMs	Datastores Networks CPU FI Used: 684 MHz Capas Memory FI Used: 43.72 GB Ca Storage FI Used: 18.28 GB Capas	Linked ee: 89.52 GHz ity: 70.21 GHz ee: 148.28 GB pacity: 192 GB ree: 847.96 GB city: 788.24 GB
	Custom Attributes	✓ Tags			~
	Version 6.7.0 Build 8170161		Aanager		~
Pecent Tacks Alarms					\$

# Enable DRS

Since we disabled DRS during our preparing to upgrade post, it should be enabled once again. We begin this task by highlighting the cluster and then clicking on the **Configure** tab to view vSphere DRS settings. If you had set DRS to **Manual** versus disabling, now is the time to change that also.

Next click **Edit** to continue.



vm vSphere Client Me	nu 🗸 🔍 Search		C 🛛 V Administrator@VSPHERE_LOCAL V
vSphere Client     Met       vcsa-whiplash-01.cpbu.lab     Q       Houton     Q       Houton       Houton       esx-crate-01.cpbu.lab       esx-crate-02.cpbu.lab       esx-crate-03.cpbu.lab       esx-crate-03.cpbu.lab       Server2016       VCSA-WHIPLASH-01       VCSA67       VUM60       Win10	nu V Q Search C Search C HOU ACTIONS Summary Monitor VSphere Availability Configuration General Licensing VMware EVC VM/Host Groups VM/Host Rules VM Overrides Host Options	Configure Permissions Hosts VMs VSphere DRS is Turned OFF	C       ⑦ ~       Administrator@VSPHERELOCAL ~       ②         Datastores       Networks       Updates         RESTORE RESOURCE POOL TREE       EDIT
	Host Profile VO Filters More Alarm Definitions Scheduled Tasks VSAN Services Disk Management Fault Domains iSCSI Target Service		

Recent Tasks Alarms

In the *Edit Cluster Settings* window, click the slider switch to enable **vSphere DRS** then click **OK** to save. DRS is now enabled on the cluster.

/Sphere DRS O Automation Additional Op	otions Power Management Advanced Options		
Automation Level	Fully Automated 🗸		
	DRS automatically places virtual machines onto hosts at VM power-on, and		
	virtual machines are automatically migrated from one host to another to		
	optimize resource utilization.		
Migration Threshold $i$	Conservative Aggressive		
	DRS provides recommendations when workloads are moderately imbalanced.		
	This threshold is suggested for environments with stable workloads. (Default)		
Predictive DRS $i$	Enable		
/introduction Automation .	✓ Enable		
virtual machine Automation $l$			
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NOTE: You can also quickly perform these actions via PowerCLI with the 'Set-Cluster' cmdlet.

Enable DRS:

Set DRS automation level to Fully Automated:

by Broadcom

\$

# **Final Steps**

After the vCenter Server Upgrade is completed, it is important to call out that power off operations only happen automatically for the vCenter Server, the VUM server must be powered off manually.

As a best practice, I suggest removing the Network Card from the old vCenter Server as well as renaming the VM to differentiate it within inventory and mitigate any accidental power on operations. Notice the new VCSA (VCSA67) virtual machine inventory name that was given. Note that renaming the VM does not change the FQDN of the VCSA, this is just the inventory name of the VM.

Lastly, be sure to power off the VUM server since it is no longer required to be running.

vm vSphere Client Menu	✓ Q Search		C	Administrator@VSPHERE	
Vcsa-whiplash-01.cpbu.lab       Houston       Hou       Hou	Vcsa-whiplash-01.cpbu Summary Monitor Configure	Iab ACTIONS - Permissions Datacenters	Hosts & Clusters VM	As Datastores CPU Used: 684 MHz	Networks Linked Free: 60.52 GHz Capacity: 70.21 GHz
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	Version Information Version 6.7.0	~ 	Tags Update Manager		~
	Build 8170161				
Recent Tasks Alarms					*

# Rollback

Did your maintenance window close or maybe you encountered another issue during an Upgrade? Not to worry, rollback is quite simple. In this vSphere environment that we just upgraded we have no external PSCs, only the vCenter Server Appliance to worry about. If we did have an external PSC, we would first power off the newly deployed PSC, restore the PSC instance from backup, and if it was joined to an Active Directory domain, re-join it to the domain.

In our case without an external PSC we would, power off the newly deployed vCenter Server Appliance 6.7, bring the old vCenter Server Appliance 6.0 instance online (If already powered off, simply power it on. If not powered off, a restart is required), if it was joined to an Active Directory domain, it may need to be joined again (if your vCenter Server was Windows, be sure to have a local account on the server and do not rely on any cached credentials). Lastly we wait for all vCenter Server services to start and log in to the vSphere Web Client to verify the vSphere inventory.

Please review KB2146453 for more guidance on rollbacks.

# Conclusion

### Remember; Focus, Plan, Execute!

We have successfully executed our vCenter Server Upgrade! We started by reviewing our prerequisites & compatibility, gathering our data, and then upgrading our vCenter Server and vSphere Update Manager (VUM) from vSphere 6.0 Update3 to 6.7. Our VUM was migrated to the 6.7 VCSA also during this upgrade scenario. In the next **vSphere Upgrade Series** post, we will move to upgrading our vSphere 6.0 ESXi hosts to vSphere 6.7 by utilizing vSphere Update Manager to remediate.



Please do not hesitate to post questions in the comments section of this blog or reach out to me directly via Twitter @vCenterNerd.

Article:

https://blogs.vmware.com/vsphere/2018/09/vsphere-upgrade-series-part-4-upgrading-vmware-tools-and-vm-compat ibility.html

Date: 2018-10-29



