

Automation and Integration with Microsoft System Center Virtual Machine Manager 2012 SP1 and Dell EqualLogic Storage

This deployment and configuration guide will describe the extensive integration of Dell EqualLogic arrays with Microsoft System Center Virtual Machine Manager.

Dell Storage Engineering October 2013



Revisions

The following table describes the release history of this Deployment and Configuration Guide.

Report	Date	Document Revision
1.0	October	Initial Release

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Acknowledgements

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Dell EqualLogic storage solutions

To learn more about Dell EqualLogic products and new releases being planned, visit the Dell EqualLogic TechCenter site: <u>http://delltechcenter.com/page/EqualLogic</u>. Here you can also find articles, demos, online discussions, technical documentation, and more details about the benefits of our product family.

For an updated Dell EqualLogic compatibility list please visit the following URL: <u>https://eqlsupport.dell.com/compatibility</u>

Software information

The following table shows the software and firmware used for the preparation of this Technical Report.

Vendor	Model	Software Revision
Dell	Host Integration Tools for Microsoft, includes Auto-Snapshot Manager/ME, PowerShell tools for De	V4.5, V4.6
Dell	Dell EqualLogic Firmware	V6.0+

Referenced documentation

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The following table lists the documents referred to in this Technical Report. All Dell EqualLogic Technical Reports are available on the Customer Support site at: eqlsupport.dell.com

Vendor	Document Title
Dell	TR1089 Windows Command-line Automation Techniques
Dell	Understanding Microsoft Offloaded Data Transfer on Dell EqualLogic Arrays



1 Introduction

Microsoft Virtualization is becoming more important as the adoption for cloud technologies increases. The technology that is brought together to accommodate the new burden on virtualization can be a huge challenge for information professionals to manage, protect and scale. In addition the administration of multiple user interfaces to accomplish day to day storage operations adds to this challenge. With tight integration with Windows Server 2012 and System Center Virtual Machine Manager (SCVMM) 2012 SP1, Dell is able to provide simplified management while retaining the resilience and scalability through Dell EqualLogic and Compellent SAN storage.

This document will outline the processes and techniques to take advantage of these features for Dell EqualLogic storage so the organization may benefit from the simplicity and flexibility offered by this additional functionality for virtualized Windows environments.

1.1 Audience

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The information in this guide is intended for IT professionals who administer Dell storage products with Windows virtual environments.

1.2 Windows Server 2012 storage functionality enhancements

Windows Server 2012 and Windows 8 offer additional storage functionality to enable efficiencies, improve performance and simplify management. Dell has collaborated with Microsoft to provide support in the Dell EqualLogic product portfolio for these latest storage innovations:

Storage system enhancements for Windows Server 2012 and Windows 8 include:

- Storage Management Architecture enables the operating system and applications to seamlessly integrate into the storage subsystem such as File and Storage Services, System Center Virtual Machine Manager (SCVMM) and PowerShell storage management cmdlets.
- Unmap The ability to notify the storage subsystems to reclaim space freed up by the operating system.
- Offloaded Data Transfers (ODX) large data transfers managed by the SAN infrastructure to improve performance and lighten the burden on the networks and servers.

The focus of this document will be on SCVMM with the intention of describing how to use SCVMM in a Dell EqualLogic environment.



1.3 Conventions used in this document

The following table will list the conventions for acronyms used throughout this document

Full Description	Acronym
System Center Virtual Machine Manager	SCVMM
User Interface	UI
System Center Virtual Machine Manager Console	SCVMM UI
Storage Management Provider	SMP
Host Integration Tools for Microsoft	HIT/Microsoft®
Auto-Snapshot Manager/Microsoft Edition	ASM/ME
Dell EqualLogic Group	PS Series Group
Dell EqualLogic Pool	PS Series Pool
virtual machine	VM

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2 Storage management architecture

Windows Server 2012 and Windows 8 introduced a new Storage Management Architecture to help reduce management complexity as well as optimize storage through native Windows Storage Management Applications.



Figure 1 Windows Server 2012 Storage Management Architecture

Figure 1 shows that Storage Management Applications such as SCVMM 2012 SP1, File and Storage Services and PowerShell will use a common interface to manage storage subsystems that have vendor supplied providers based on SMP or SMI-S.

Dell EqualLogic is an SMP compliant storage subsystem while Dell Compellent storage is SMI-S compliant. Regardless of whether an SMP or SMI-S provider is used the management processes are the same. The differences are the subsystem commands that communicate to the operation system and the initial provider configuration.

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2.1 Microsoft System Center Virtual Machine Manager (SCVMM)

Virtual Machine Manager is one of the core components for the System Center suite of applications that help administrators to comprehensively manage their applications, services, physical resources, hypervisors, software defined networks and storage resources in order to create and deploy virtual machines and services to hosts and private clouds that have been established.

SCVMM fits into System Center application and infrastructure management framework and provides simplified deployment and management capabilities. SCVMM is tightly integrated into supporting storage infrastructures. SCVMM 2012 SP1 also has support for the Storage Management Application interface (SM API) to allow for seamless communication with Dell EqualLogic storage.

For more information about SCVMM please see the appropriate Microsoft documentation and TechNet articles such as: <u>http://technet.microsoft.com/en-us/library/gg671827.aspx</u>



2.2 System Center Virtual Machine Manager (SCVMM) and Dell EqualLogic Storage functionality

SCVMM uses the Dell EqualLogic Storage Management Provider (SMP) to communicate with the PS Series groups. The Dell EqualLogic SMP enables management of Dell EqualLogic storage directly through native Windows storage interfaces such as PowerShell cmdlets, File and Storage Services user interface (UI) in the Server Manager console, standard Windows Management Instrumentation (WMI) API and SCVMM 2012 SP1.

Host Integration Tools for Microsoft v4.5 (HIT/Microsoft®) includes the SMP for Windows 8, Windows Server 2012. Support for SCVMM 2012 SP1 is included with HIT/Microsoft® v4.6.

The Dell EqualLogic SMP is an optional component installed by default by the HIT/Microsoft installer. The provider is hosted by the Dell EqualLogic SMP Host Service (EqISMPHost).

The following are tasks supported for Dell EqualLogic storage with SCVMM:

Storage Resource manipulation:

- Discovery, creation and deletion of Dell EqualLogic volumes on the configured PS Series groups
- Creation and deletion of snapshots or clones
- Assigning Dell EqualLogic volumes to host groups (Hyper-V hosts) in SCVMM
- Registering (unregistering) Dell EqualLogic volumes to the managed hosts or clusters (including CSVs to a cluster)

Virtual Machine specific functions:

- Creation of VM Templates which are "SAN Copy capable"
- Rapid VM provisioning
- VM Migration
- VM Storage Migration

<u>SAN Copy Capable</u> – is a virtual machine template which is capable of the SAN transfer method which takes advantage of the efficiencies and intelligence of Dell EqualLogic storage.

<u>Rapid VM provisioning</u> – is the method of provisioning virtual machines based on SAN Copy Capable VM templates. The deployment of those virtual machines will leverage the Dell EqualLogic storage for the most effective way to provision the virtual machines storage.

Automation:

- Windows native PowerShell cmdlets
- SCVMM cmdlets
- Dell EqualLogic specific PowerShell cmdlets (installed with HIT/Microsoft®)



2.3 Considerations for SCVMM installation and integration with Dell EqualLogic storage

For a successful installation the following should be considered for SCVMM 2012 SP1 integration with Dell EqualLogic storage.

Server Hardware and Software requirements from Microsoft are located at http://technet.microsoft.com/en-us/library/gg610562.aspx

Summary of SCVMM and Dell EqualLogic integration Pre-Requisites:

- Install Host Integration Tools for Microsoft v4.6 (HIT/Microsoft®) available from the Dell EqualLogic support site https://eqlsupport.dell.com.
- Install the Windows Automated Installation kit (WAIK) for Windows 7
- Install SQL Server (2008 R2 or 2012)
- Install Windows Assessment and Deployment Kit (WADK) for Windows 8 (after SQL Server has been installed).
- Install SCVMM 2012 SP1. The SCVMM Server will need access to the Dell EqualLogic group that will be deploying the virtual machines.
- The Hyper-V servers and the SCVMM servers will need to have access to the same Dell EqualLogic storage resources.

Host Integration Tools for Microsoft® and Auto-Snapshot Manager/Microsoft® Edition

The HIT/Microsoft® includes Auto-Snapshot Manager/Microsoft® (ASM/ME) – enabling the ability to create data- and application-consistent Smart Copies of NTFS volumes, Exchange Server databases, Hyper-V virtual machines, SharePoint databases and Farms, and SQL Server databases. ASM/ME offers application-consistent Smart Copies utilizing the built-in snapshot, clone and replication facilities in PS Series arrays.

The HIT/Microsoft[®] (with included ASM/ME) provides advanced MPIO for Dell EqualLogic storage for availability and performance as well as the ability to configure SMP communication.

Note: The Dell PS Series groups should be accessible by the SCVMM Server, SCVMM Library Servers and all managed Hyper-V hosts. PS Series Group access is established through the HIT/Microsoft® tools.



3 Objective

Various common SCVMM operations will be reviewed with the intent to demonstrate simplicity of management. Most operations may be accomplished using either a GUI or by using PowerShell cmdlets and will be differentiated appropriately throughout the guide.

The following Windows Server 2012 and SCVMM 2012 SP1 operations will be described:

- Enabling the SMP Provider for EqualLogic through Auto-Snapshot Manager/Microsoft Edition
- Importing the SMP provider for EqualLogic through SCVMM UI
- Allocating Storage pools through SCVMM UI
- Volume Provisioning through SCVMM UI
- Volume Provisioning through Windows File and Storage Services
- Creating a SAN Copy Capable Virtual Machine Template through SCVMM UI
- Rapid Provisioning of Virtual Machines through SCVMM UI
- VM Migration through SCVMM UI
- VM Storage Migration through SCVMM UI

PowerShell operations are described in the <u>Appendix A</u> for the following:

- Enabling the SMP Provider for EqualLogic using PowerShell
- Importing the SMP provider for EqualLogic using PowerShell
- Volume Provisioning through SCVMM using PowerShell
- Volume Provisioning through File and Storage Services using PowerShell
- Creating a SAN Copy Capable Virtual Machine Template using PowerShell
- Rapid Provisioning of Virtual Machines using PowerShell



3.1 Lab Environment and Setup

For the deployment demonstrations of this document the following Lab environment was configured.

- 1 x Dell M1000e Blade Chassis
- 2 x Dell M620's Hyper-V Blade servers (Windows Server 2012 Datacenter)
- 2 x Intel(R) Xeon(R) CPU E5-2640 0 @ 2.50GHz and 128GB memory
- 2 x M6220 Blade GigE switches
- 1 x PS5000XV 16x300GB 15K GigE Dell EqualLogic storage array

One Hyper-V host (CFHV1-2012) had a Windows Server 2012 virtual machine which SCVMM 2012 SP1 was installed.

For this setup the SCVMM Library server for the rapid provisioning template is also located on the SCVMM virtual machine.

Note: The SCVMM Library server may be separate from the management host.

In addition one Hyper-V host (CFHV2-2012) served as both a staging area for initial gold virtual hard disk preparation and a Library server for ISO disk images of Windows operating systems to create virtual machines from a blank disk.

The diagram below represents the LAB environment. All storage is on the PS5000XV, VM Templates are stored on Dell EqualLogic Template volumes. Thin Clones will contain the deployed virtual machines

while the virtual machine destination will have mounted volumes ^{IB} ^{LU1} to those Thin Clones. This process is discussed further in the "Creating VM Templates" section <u>here</u>.





Volumes used for SCVMM

The following volumes were allocated on Dell EqualLogic storage to provide a flexible environment for the purposes of this document. Below is a list of the volumes used in this LAB environment for reference and convenience.

Optional:

- An ISO volume to be used as a convenient container of the images needed to create golden VM copies from blank VMs. More information on how to create VMs from an ISO is located in <u>Appendix B.</u>
- A staging volume for the initial VM created (Syspreped source for the VHDX).

Required: (for VM provisioning and migration)

- A volume which will contain the gold image and a "SAN Copy Capable" VM template (Dell EqualLogic "Template" volume)
- A Destination volume(s) for all rapidly provisioned VMs (per Hyper-V host as needed).

These volumes were created through SCVMM or File and Storage Services; however the volumes below may be created through any of the provisioning methods available.

Purpose	Volume Label (Drive Letter)	Virtual Disk = Dell EqualLogic Volume name	Server	SCVMM Library	Share name
ISOs	HV1_ISOs (E:)	CFISOsForVMM	CFHV1-2012	Yes	HV1_ISOs
Prepare VM	StagingWin2012 (S:)	CFVMTemplates	CFHV1-2012	No	
VM Destination (Required)	CFHV2-VMDest (V:)	CFHV2VmStores	CFHV2-2012	No	
SAN Copy Capable VM Template (Required)	CFWin2012SP1 (J:)	CFWin2012SP1	CFVMMonHV1	Yes	CFWin2012SP1

Table 1Volumes used in this document for reference

Note: The SCVMM library is a catalog of resources that provides access to virtual hard disks, virtual floppy disks, ISO images, scripts, driver files, virtual machines and service templates and profiles stored on the SCVMM database. To provision a library share volumes with those items must be shared and configured in the SCVMM Library server.



4 Configure SMP for Dell EqualLogic

Once SCVMM and the Dell[™] EqualLogic Host Integration Tools for Windows[®] (HIT/Microsoft®) are installed the Storage Management Provider (SMP) may then be imported into SCVMM to expose the storage subsystems that will need to be managed. The HIT/Microsoft® and Auto-Snapshot Manager/Microsoft® Edition (ASM/ME) needs to be installed on the SCVMM Server and each Hyper-V host that will be managed by SCVMM and participate in VM provisioning, migration or assignment of logical units to the SCVMM host groups. SCVMM 2012 SP1 requires at least v4.6 of the HIT/Microsoft®.

Note: Auto-Snapshot Manager/Microsoft® Edition has the ability to remotely install HIT/Microsoft® and centrally manage Windows servers that are using Dell EqualLogic storage. Please see the *"Auto-Snapshot Manager Microsoft® Edition v4.6 User Guide"* for more information.

For SCVMM to manage external storage from Dell the provider needs to be imported which is performed after the HIT/Microsoft® is installed and PS Series group access is established. In the SCVMM UI a user defined "Classification" to identify the discovered and allocated storage will then allow for SCVMM UI or PowerShell to manage the Dell EqualLogic storage.

The process flow below indicates the steps needed to register and enable the SMP interface for SCVMM storage management.



Figure 2 Process to import the SMP provider.



4.1 Configuring PS Series Group access for SMP through Auto-Snapshot Manager/Microsoft® Edition

1. Install the HIT/Microsoft® on each Hyper-V server managed by SCVMM as well as the SCVMM Server. HIT/Microsoft® will install ASM/ME by default.



- For Each Hyper-V server and SCVMM Server: Launch Auto-Snapshot Manager (ASM/ME) and click on Settings-> PS Group Access.
- 3. Click Add PS Group.





Group Name and IP are located in the Group Manager GUI.

Location of PS Group Name and Group IP address from the EqualLogic Group Manager: **Group Configuration > General Settings > General** tab

4. Enter the **PS Group Name**, **Group IP** address and then Click **Save** to verify the connection to the PS Group



PowerShell/SMP access configuration

-PS Group Access							
🛛 🔺 🔁 tekmkt-test (cfvm	imonhv1)						
VDS/VSS acce	55						
Smart Copy a	ccess						
PowerShell/SN							
Credentials used by Power	rShell/SMP to authenticate access						
Group.	Shely Shir to datienticate access						
-Group 'tekmkt-test'	PowerShell/SMP Settings —						
PS Group Management IP	10.124.2.100						
📕 Use Single Sign On							
PS Group Username	grpadmin						
PS Group Password	•••••						

5. Enter the credentials for PowerShell/SMP access (PS Authentication)

Note: If the PS Series group has a Management network enter the PS Group Management IP address instead of the Group IP.

Select **Use Single Sign On** if desired to allow for Active Directory authentication to be used for PS Group administration.

Note: For **Single Sign-On** (SSO) access for a particular PS Series group, the logon account for the SCVMM service (vmmservice.exe) must be enabled for management on that group. Alternatively, you can enable an AD user group on the group if the SCVMM service account is part of that AD user group. See the "*Dell EqualLogic Auto-Snapshot Manager/Microsoft Edition User's Guide*" for more information located on the Dell EqualLogic support site: <u>https://eqlsupport.dell.com</u>.



Smart Copy and VDS/VSS will use CHAP authentication as required by Microsoft services and should be authenticated as well to enable Smart Copy protection of the Hyper-V VMs.

This process should be repeated for each Hyper-V host that is managed by SCVMM as well as the SCVMM server. A single ASM/ME interface may be used to manage all hosts connected to Dell EqualLogic arrays.



5 Using the SMP provider with SCVMM

The Windows Server 2012 Storage Management architecture communicates to the Dell EqualLogic Storage through the SMP provider. In order to access the Dell EqualLogic storage resources the Dell EqualLogic SMP provider will need to be imported into the SCVMM environment. The following process will show how to add PS Series arrays and pools by importing the SMP provider for Dell EqualLogic through the SCVMM UI.

5.1 Adding Dell EqualLogic storage with the SMP provider through the SCVMM UI

Adding storage devices to SCVMM management occurs through the storage Providers feature which upon import will allow for discovery of available Dell EqualLogic storage resources.

Apps	Results for "virtu"
Virtual Machin Manager Con	ne sole
Virtual Machin Manager	ne

1. Launch SCVMM UI (Virtual Machine Manager Console)



Add Storage Devices

Create Create Create File Cre	ate Add	Allocate	Overview Fabric	rices Power	Refresh	Rescan	Remove
Create	Add	Capacity	Show	Windo	ow Refresh	Rescan	Remove
bric	Providers (0)						
M Servers							
- Networking	Name		 Management Address 	Arrays		Stat	tus
Storage Classification and Pools Provid Arrays Arrays File Servers			There a	are no items to show in th	ils view		
Storage Classification and Pools Provide Arrays File Servers VMs and Services			There a	rre no items to show in th	iis view		
Storage Classification and Pools Provide Add Storage Devices File Servers VMs and Services			There a	rre no items to show in th	iis view		
Storage Classification and Pools Provide Add Storage Devices File Servers VMs and Services Fabric Library Library			There a	rre no items to show in th			
Storage Classification and Pools Provide Arrays Arrays File Servers VMs and Services Fabric Library Jobs			There a	are no items to show in th			

2. Click on **Fabric Resources** from the top of the Home Tab then navigate to **Storage** -> **Providers**. Right mouse click on **Providers** and Click "Add Storage Devices".



Select storage provider type

2	Add Storage Devices Wizard	x
😫 Select Pro	vider Type	
Select Provider Type	Select a storage provider type	
Specify Discovery Scope	Before you begin this wizard you might have to manually install a storage provider. Select the type of storage provider that is managing the storage device that you would like to add.	
Select Storage Devices	 Add a Windows-based file server as managed storage device This options brings a clustered or non-clustered Windows-based file server under management. 	
Summary	 Add a storage device that is managed by an SMI-S provider This option brings a block storage array, or network attached storage (NAS) device under management. 	
	Add a storage device that is managed by an SMP provider This option brings a block storage array device under management.	
	₽ A	
	Previous Next Cance	1

3. Select Add a storage device that is managed by an SMP provider, and click Next.



Import and select the discovered SMP provider

4	Add Storage Devices Wizard	×
😫 Specify Di	iscovery Scope	
Select Provider Type	Import and select an SMP provider	
Specify Discovery Scope		
Gather Information	Provider: Dell EqualLogic Storage Management Provider ((A2A72424-E938-4221-A	Import
Select Storage Devices		
Summary		
	-v.	
	Previous Next	Cancel

4. Click **Import** then select the "Dell EqualLogic Storage Management Provider {..}" from the dropdown and click **Next**.

NOTE: The provider will appear if the HIT/Microsoft® has been installed and PowerShell/SMP is configured.



2		Add Storage Devi	ces Wizard		X
📤 Gather Info	ormation				
Select Provider Type	Discover and	import storage de	evice information		
Specify Discovery Scope					Scan Provider
Gather Information	Storage Device	Pools	Manufacturer	Model	Capacity
Select Storage Devices	tekmkt-test	syncrep1	Dell	PS5000	4,278.68 GB
Summary					
			Pre	evious Next	Cancel

5. The "Add Storage Devices Wizard" will scan for the connected PS Series Groups and Pools. Click **Next** when the storage devices are listed in the table.

Note: The ASM/ME PS Series Group access and PowerShell/SMP access must be configured to allow SCVMM to discover the Dell EqualLogic storage.



Select the target Storage Device and pool

2		Ad	d Storage Devi	ices Wizard			X					
😫 Select Stor	age l	Devices				A						
Select Provider Type Specify Discovery Scope Gather Information	Selec Bringii Virtua	Select file shares to place under management Bringing file shares under management will make them available for use in computers managed by Virtual Machine Manager.										
Select Storage Devices		Storage Device	Pool ID	Classification		Total Capacity	Available Capacity					
Summary		tekmkt-test v syncrep1	08A09006-020	syncrep1-tekmkt-test	•	4,278.68 GB	3,075.70 GB					
				Pr	revio	ous Next	Cancel					

6. Check the desired Storage Device (s) then Click on **Create classification...**

Note: The Storage Devices may be configured on this page by checking the boxes next to the appropriate PS Series pools for access. If desired a separate classification may be created for each pool.



Create a storage classification

Storage classification is a user defined way to categorize different properties of storage pools or devices based on criteria such as SLA, use case or even identification of a storage pool. Standards for these types of storage devices may be developed for instance a classification of "Gold" may represent SSD or 15K disks in the pool. In the example below the classification is based on the identity of the device. For this Classification "syncrep1" is the PS Series Pool which is located on a PS Series Group "tekmkt-test".

8	New Classification	x
Create a stora	ge classification	
Name:	syncrep1-tekmkt-test	
Description:	PS Pool: syncrep1 PS Array: tekmkt-test	
View Script	Add	Cancel

7. Specify the Name and Description then click Add

More information on Storage Classification may be found here <u>http://technet.microsoft.com/en-us/library/gg610685.aspx</u>



Complete the Add storage device process

Č	Add Storage Devices Wizard	X
😫 Summary	AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAA	
Select Provider Type Specify Discovery Scope	Confirm the settings	View Script
Gather Information Select Storage Devices	Resource type: Storage device Discovery scope: {A2A72424-E938-4221-A673-8F453DF0A1F9} Storage provider type: SMP WMI	
Summary	Managed storage pools:	
	Previous Finish	Cancel

8. Click **Finish** to complete adding the storage devices to SCVMM management.



Verify the SMP provider has been imported correctly

Name	St	tatus	Ŧ	Start Tim	2	Ŧ	Result Name		Owner		
🔮 Creates r	new Storage Coi	mpleted		9/11/201	3 8:39:59 A	١M	syncrep1-tekm	kt-test SPARTAN\cfvm			
🕑 Creates I	new Storage Class	sification									
Status:	Completed	Property			Previous	Valu	Je	New Va	Vew Value		
Command:	New- SCStorageClassi	🗉 🕕 Storage	Image Classification - syncrep1-tekmkt-test								
	fication	Name			(none)			syncrep1-tekmkt-test			
Result name	syncrep1- tekmkt-test										
Started:	9/11/2013 8:39:59 AM										
Duration:	00:00:00										
Owner:	SPARTAN \cfvmm										

Note: The Jobs work space; "History - Recent Jobs" window will show the status for the import and Classification creation



The Providers will be show in the Fabric workspace, Providers panel under the Storage node



Administrator - CFVMMonHV	'1.spartan	local - Virtu.	al Machine	Manage	er			
Home Home	Graata			Quantiau	Eabric	Services	27 F	PowerShell lobs
Classification Logical Unit Share Create	*	Resources • Add	Capacity Capacity	(Resources	Hosts/Clusters 24.2.100		PRO
Fabric < Habric	Classificati Name	ons (1), Storage	ePools (1), an	d Logical	Deel	EqualLogi	ic Grc	oup Manag
Storage Classification and Pools Providers	E Syr	ncrep1-tekmkt- yncrep1 CFHV1VMS	test Clas Stor Log	sificatior age poo ical unit	Volum	es		Volume CF volume ar
Ø Arrays Ile Servers		CFHV2vmStor CFISOsForVMI CFSSDISK1	age Log M Log Log	ical unit ical unit ical unit		OsForVMM MMLibrary /3		Volume space
		CFSSDISK2 CFSSDISK3	Log Log	ical unit ical unit	5.0	0 GB 4.7 0 GB 4.8	1 GB N	lo lo
White and Services	CFVMMLibrary			ical unit ical unit	250.0 11.0	0 GB 4.8 0 GB 240.4 0 GB 2.2	6 GB Y	es es
Fabric		FogV3 FS7500-vol1	Log Log	ical unit ical unit	9.7 513.7	7 GB 9.6 5 GB 207.3	2 GB Y 5 GB Y	es es
🧮 Library		FS7500-vol2	Log	ical unit	513.7	5 GB 208.1	5 GB Y	es

Compare SCVMM storage discovery to Dell EqualLogic Group Manager

Note: Under Classification and Pools all Pools will be listed by the Classification created. "Logical unit" in SCVMM equates to "Volume" on Dell EqualLogic storage.

See also <u>Appendix A</u>: "<u>Enabling the SMP Provider for EqualLogic using PowerShell</u>" and "<u>Importing the</u> <u>SMP provider for EqualLogic using PowerShell</u>"



Allocate Storage Pools to a Host Group through SCVMM UI

Dell PS Series pools and groups must be allocated to SCVMM host groups (Hyper-V hosts managed by SCVMM) allowing for the creation and assignment of volumes and rapid provisioning of virtual machines.

For more information see Microsoft's TechNet library <u>http://technet.microsoft.com/en-us/library/gg610635.aspx</u>

Fabric	<	Hosts (1)						
Servers (2)								
All Hosts	Create Serv	ice	Hog					
Library Servers	Create Virtu	al Machine						
PXE Servers	Add Hyper-	V Hosts and Clusters						
Update Server	Add Citrix X	enServer Hosts and Clusters						
vCenter Servers	Add VMwar	e ESX Hosts and Clusters						
VMM Server	Create Host	: Group						
> 📥 Networking 🔢	Move							
🔺 길 Storage 🏾 🚨	View Netwo	View Networking						
📒 Classification and F 🗙	Delete	Delete						
Pro 1	Properties	(3)						
File Servers								
Whs and Services	(1)							

6

1. In the Fabric (1) workspace, click on All hosts (2) Right mouse click and then Click Properties (3).



Allocating Storage pools through SCVMM

8	All Hosts Pro	perties X									
General	Storage										
Placement Rules	Storage capacity for this host group includes storage allocated to the parent host groups.										
Host Reserves	Storage capacity for hosts in this host group										
	Local	Remote									
Dynamic Optimization	Total capacity: 0 GB	Total capacity: 69.76 GB									
Network	Available capacity: 0 GB	Available capacity: 46.97 GB									
	Allocated storage for this host group										
Storage	Logical units	Allocate Storage Pools									
Custom Properties	Number of logical units: 1	Anocate otorage roots									
	Total capacity: 2.00 GB	Allocate Logical Units									
	Available capacity: 1.90 GB										
	Storage pools:										
	Name Classification Total Capacity I	Description									
and there											
View Script		OK Cancel									

2. Click on "Allocate Storage Pools" which will open the "Allocate Storage Pools" window shown in the next step.



Allocating Storage pools through SCVMM

B		Alloca	ate Storage Po	ols				X			
Allocate storage to this host group for virtual machine workloads											
The storage allocated to a host from an individual storage pool is used only for virtual machine workloads.											
Display as available only storage arrays that are visible to any host in the host group											
Available stora	ge pools:							٩			
Storage Pool	Classification	Total Capacity	Available Capac	ty De	scription	I					
	(1)										
					(2)	Add	Rer	nove			
Allocated stora	ige pools:							٩			
Storage Pool	Classification	Total Ca	apacity Available	e Capao	tity Hos	st Groups					
syncrep1	syncrep1-tekm	kt-test 4,278	.68 GB 3,	075.70	GB All I	Hosts					
View Script					(3)	OK	C	ancel			

3. In the top grid table of the window the available storage pools will appear. Click on each available storage pool (1) then click Add (2) until they move to the bottom part of the window in the "Allocated storage pools" grid table. Click OK (3).

Note: The Add button will be enabled only when Available storage pools are present.

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7 Volume Provisioning Methods

Several methods of provisioning volumes are available with Dell EqualLogic Storage. The volumes used in this document are provisioned through SCVMM or File and Storage Services user interfaces. However the legacy options are available but will not be demonstrated.

Option 1: Dell EqualLogic Group Manager

- In EqualLogic Group Manager create a volume with the appropriate access
- Use the Windows iSCSI Initiator tool to connect the iSCSI Target (the volume)
- Use Windows "Disk Manager" would bring the volume online, format and partition, drive letter or mount point assignment.

Option 2: Windows Server 2012 native applications

- Create a volume through SCVMM UI
- Create a volume through Windows File and Storage Services

Option 3: PowerShell or API

- Dell EqualLogic PowerShell cmdlets or PSAPI CLI
- <u>Windows Server 2012 PowerShell cmdlets</u>

The following section will show options for Windows Server 2012 (Option 2 and 3) as a reference for the available volume provisioning functionality.



7.1 Volume Provisioning using native Windows applications

The SMP provider allows for storage allocation on Dell EqualLogic arrays through SCVMM and File and Storage Services. These steps will show how to create new volumes through SCVMM and File and Storage Services and bring those volumes online to the hosts.

Note: The following volume provisioning sections are simply to demonstrate some of the new integrations with Dell EqualLogic storage. Alternatively traditional methods of Dell EqualLogic volume provisioning may be used.

7.2 Volume Provisioning through SCVMM UI

The process to provision a Dell EqualLogic volume through SCVMM involves the following:

- 1. Select the Hyper-V host (or cluster) for the Dell EqualLogic volume to be created
- 2. Add the logical unit from the storage option under properties for that Hyper-V host (or cluster)
- 3. Specify the storage pool, name, size and thick or thin provisioning for the volume
- 4. Format, specify the volume label and assign a drive letter

The benefit of using this process to create a volume assigned to the Hyper-V host is the avoidance of switching between multiple user interfaces such as the Microsoft iSCSI Initiator tool, Windows Disk manager or Dell EqualLogic Group Manager providing ease and simplicity for management.



Figure 3 VMM volume creation process

This section will use SCVMM exclusively to create a volume on a Hyper-V host that will be used to store and stage gold images. See <u>Table 1</u> for the "Prepare VM" volume.



Pre-requisites: HIT/Microsoft® on Hyper-V and SCVMM Server with SMP enabled and imported to SCVMM.



1. Launch SCVMM UI (Virtual Machine Manager Console)



B			Serve	er Tools	s Ad	Iministrato	- CFVI	MMonHV1.sp	partan	local - V	/irtual M	lachine	_		X I
∎.	Home	Folde	er H	lost											^ 🕜
*	-	•			9		Ð				Ċ,	0			_
Create •	Add Resourc	es •	Overview	Fab Resou	ric Irces	Compliance	Scar	n Remediate (Complia Proper	ance U ties A	pdate Re Agent	associate	Wind	ow	
Create	Add			Sł	now			Complianc	e		Age	nt			
Fabric				<	Hosts	; (1)									
🔺 🁥 Sen	vers			<u> </u>											٩
4 🗎 A	II Hosts		_		Nam	e		Host Status	Ŧ	Role	Jo T	CPU A	Av	Ŧ	Opera
₿	cfhv1-201	2			8	cfhv1-2012.sp	artan.loc	OK		Library,	Comple	6 %	111.8	5	Micros
1) 11	cfhv2-201	2		=											
i i i i i i i i i i i i i i i i i i i	brary Serv	ers													
l∎ P. Bau	ndate Sen	er													
	Center Sen	vers													~
i v	MM Serve	r													
▶ 📥 Net	working														
🔺 🔒 Sto	rane			-											
🔯 VM	ls and Ser	vices													
🔮 Fab	oric														
📕 Lib	rary														
🗐 Job	IS														
🗾 Set	tings														
				•											

Choose the host to provision the volume on

In the Fabric workspace under Servers -> All Hosts expand and select the desired host to
provision the volume on. In the example above "cfhv1-2012" will be the Hyper-V host assigned to
the volume.


Add a disk to the selected host

	Cfhv1-2012.spartan.local Properties				
General	Storage				
Status	👍 Add 🗙 Remove				
Hardware	Add Disk Add iSCSI Array	Array name: tekmkt-test SM name: 10.124.2.100			
Host Access	Add File Share	Total capacity: 4,278.68 GB			
Virtual Machine Paths	\\.\PHYSICALDRIVE1 200.01 GB (172.59	Storage pools: 1 (1 managed)			
Reserves	\\.\PHYSICALDRIVE2 350.01 GB (302.01	The target supports multiple sessions, you can create additional session by clicking Create Session.			
Storage	↓\.\PHYSICALDRIVE3 0.01 GB (0 GB avail	Create session			
Virtual Switches	\\.\PHYSICALDRIVE5 15.00 GB (14.90 GB				
Migration Settings	\\.\PHYSICALDRIVE6 80.01 GB (71.58 GB				
Placement	🗆 iSCSI Arrays				
Servicing Windows	tekmkt-test 4,278.68 GB (1 pools)				
Custom Properties	Fibre Channel Arrays				
View Script		OK Cancel			

3. Right click and select **Properties** on the Hyper-V host which will be connected to this new volume. Select **Storage** then click **Add** and from the drop down **Add Disk**.



Create the Logical Unit

8	cfhv1-2012.	spa	artan.local Properties	x
General	Storage			
Status Hardware	Add A Remove	•	Logical unit: Logical unit ID:	A
Virtual Machine Paths	 (\\PHYSICALDRIVE1 200.01 GB (172.59 		Array: Classification: Size:	
Reserves Storage	 \\PHYSICALDRIVE2 350.01 GB (302.01 \\PHYSICALDRIVE3 0.01 GB (0 GB avail 	H	Format new disk Format this volume as NTFS volume with the following set Partition style:	E
Virtual Switches Migration Settings	 \\.\PHYSICALDRIVE5 15.00 GB (14.90 GB \\.\PHYSICALDRIVE6 80.01 GB (71.58 GB 		Volume label: New Volume Allocation unit size: Default V Quick format	
Placement	🚙 New Volume		Force format even if a filesystem is found Mount point	
Servicing Windows Custom Properties	□ iSCSI Arrays iscurpt tekmkt-test 4,278.68 GB (1 pools)	Ŧ	Assign the following drive letter: Mount in the following empty NTFS folder: Browse	•
View Script			OK	el

4. Next to Logical unit click **Create Logical Unit**

Note: Logical Unit is the same as the volume on Dell EqualLogic storage



Specify the volume parameters

Create Logical Unit X				
Specify the settings for the new logical unit				
Storage pool:	syncrep1			
Classification:	syncrep1-tekmkt-test			
Available capacity:	3,044.56 GB			
Allocation percentag	e: 53 %			
Name:	CFVMTemplates			
Description:	Location of Staging VHDS on HV1			
Size (GB):	80 🜩			
 Create thin storage Create a fixed size 	ge logical unit with capacity committed on demand e storage logical unit with capacity fully committed			
View Script	OK Cancel			

 Enter the name of the new volume and description Enter the size of the volume. This volume will contain the OS and ISO initially. Click on "Create thin storage logical unit..." if desired Click OK.

Note: In this example the logical unit size has enough capacity for both the new virtual hard disk file and the installer ISO that will be used to stage the VM. See <u>Appendix B</u> for steps to stage golden virtual machines.

Logical unit size calculation example: (75 GB VHDX file) + (5 GB for the ISO) = (80 GB logical unit)



Format the volume and assign mappings

Cfhv1-2012.spartan.local Properties					
General	Storage				
Status	👍 Add 🗙 Remove				
Hardware	🗆 Disk	Logical unit: CFVMTemi 🔻 Create Logical Unit			
Host Access	\\.\PHYSICALDRIVE0 136.13 GB (109.30	Logical unit ID: 6090A028A07F3F591D2445FD5E0110D Array: tekmkt-test			
Virtual Machine Paths	\\.\PHYSICALDRIVE1 200.01 GB (175.69	Classification: syncrep1-tekmkt-test Size: 80.00 GB			
Reserves	\\.\PHYSICALDRIVE2 350.01 GB (306.13	Format new disk			
Storage	\\.\PHYSICALDRIVE3 0.01 GB (0 GB avail	Partition style: MBR			
Virtual Switches	\\.\PHYSICALDRIVE4 11.00 GB (10.88 GB	Volume label: StagingWin2012			
Migration Settings	>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>>	Allocation unit size: Default			
Placement	StagingWin2012	Force format even if a filesystem is found			
Servicing Windows	🗆 iSCSI Arrays	Assign the following drive letter: S			
Custom Properties	itekmkt-test 4,278.68 GB (1 pools) ▼	Browse			
View Script		OK Cancel			

- 6. Check "Format this volume as NTFS volume with the following settings"
- 7. Enter a volume label (StagingWin2012 in this example)
- 8. Assign the drive letter (this example is using S:) and then click **OK**.

Status:	99 %	Step		Name	Status	Start	End
Command:	Set-SCVMHost		⊡ 1	Change properties of virtual machine	99 %	9/24/	
Result name:	cfhv1-2012.spartan.l	0	1.1	Registers Storage Logical Unit to host	Completed	9/24/	9/24/
Startade	0/24/2012 2:12:20	0	1.2	Mounts storage disk on cfhv1-2012.sp	Completed	9/24/	9/24/
Starteu.	PM						
Duration:	00:00:05						
Owner:	SPARTAN \Administrator						

Note: Use the Jobs workspace to view the status of the creation of the volume.



Administrator - CEVMMonH	V1 snart	an local - Virtua	l Machin	e Manage	r			
Home	v nopure		rividenini	e managei				
Create Create Fil Classification Logical Unit Share	e Create	Add Resources •	Allocate Capacity	Overview	Fabric Resources	vices ts/Clusters	PowerShell Jobs PRO	Remove
Create		Add	Capacity		Show		Window	Remove
Fabric	Classific	ations (1), StorageF	ools (1), ai	nd Logical U	nits (19)			
🎼 Library Servers	templa	tes						
PXE Servers	Name	•	- Ty	/pe	Total Capacity	Available C	ap Assigned	Desci
🔤 Update Server	Ξ 👫	syncrep1-tekmkt-te	est Cl	assification	4,278.68 GB	3,070.0	3 GB	
vCenter Servers	- 4	syncrep1	St	orage pool	4,278.68 GB	3,055.9	6 GB	syncr
WMM Server		CFVMTemplate:	s Lo	gical unit	80.00 GB	80.0	0 GB Yes	HV1
Networking	B			CFVMTer	mplates Properti	es		×
 Storage Classification and Pools Providers Arrays File Servers VMs and Services Fabric Library Jobs Settings 	Gene Logic Logic	ral al Unit Snapshots iated Logical Units al Unit Assignment	Ini Reg Ni iq	tiator Adc ister this sto ime 1.1991-05.co	Iresses rage local unit to th m.microsoft:cfhv1-2	e list of initiat	tor addresses:	

Verify the provisioned volume on the host

The properties page **Logical Unit Assignment** will indicate the initiator addresses assigned to this volume which in our case is to the CFHV1-2012 Hyper-V host.

This process may be repeated for other volumes connected to this host such as the destination for VMs and ISOs.

See also Appendix A: "Volume Provisioning through SCVMM using PowerShell "



7.3 Volume Provisioning through Windows File and Storage Services

This method will be used to create a volume on the SCVMM library server which is not a managed Hyper-V host. The purpose of this volume in relation to this document will be to store the golden prepared virtual hard disk image.

Note: The following is an example of creating the Dell EqualLogic volume for the VM Templates as a target for the Staging virtual hard disk.

The Dell EqualLogic array volume will be created through Windows File and Storage Services. The volume created will be converted to a Dell EqualLogic "Template" volume to be used as the source of the gold VM template.

The steps to create a Dell EqualLogic volume with Windows File and Storage Services are as follows:

On the SCVMM Server (or Library Server)

- Select the Dell EqualLogic storage pool
- Create a virtual disk on Windows File and Storage Services (which creates a Dell EqualLogic volume)
- Create a Volume from the virtual disk with Windows File and Storage Services
- Format, label and assign a drive letter or mount the volume
- Share the volume which is necessary in order to add to the SCVMM Library Server and store the VM template.





Note: Since the purpose of this volume is for later use as a template volume a share will need to be created so the SCVMM Library server will be able to have access. Adding a share may be optional for other use cases.

Volume Provisioning	ı throuah	Windows	File and	Storage	Services
	, .				

P			Server Man	ager			
E	● - · · Volur	nes • Storage Pool	S		• @ 🏲	Manage Tools V	′iew Hel
	Servers Volumes Disks Storage Pools Shares iSCSI	STORAGE POOLS All storage pools 1 t Filter Name tekmkt-test (1) syncrep1	Type Manage Storage Pool CFVMM	■ ▼ ed by // IonHV1	Available to Discover	Read-Write Server	SKS
		VIRTUAL DISKS syncrep1 on CFVMMonHV1 Filter A Name Stat FS7500-vol1 FS7500-vol2 FogV3	New Virtual Disk us Layout Provisioning Fixed Fixed Thin	SKS PHYS syncre Filte Capacity \$ 5 514 GB 0 514 GB 1 9.77 GB 2	ICAL DISKS p1 on CFVMMonHV1 rr ilot Name Physical disk in slot Physical disk in slot	P IE Statu t 0 on Equal.co t 1 on Equal.co t 2 on Equal.co	SKS ▼ Cap. 373 ^ 373 373

1. On the SCVMM Servers' Server Manager UI, "File and Storage Services" click **Storage Pools** -> then select the appropriate Dell EqualLogic storage pool (syncrep1 in this example), drop down **TASKS** under **VIRTUAL DISKS** and click on "**New Virtual Disk...**"

The Storage Pools will be discovered through Windows File and Storage Services since the SMP provider was enabled through <u>ASM/ME earlier</u>.



Select an available storage pool

B	New \	/irtual Disk Wizard	i			- • ×
Soloct the storage						
Select the storage	: poor					
Before You Begin	Storage pool:					
Storage Pool	Pool Name	Managed by	Available to	Capacity	Free Space	Subsystem
Virtual Disk Name	syncrep1	CFVMMonHV1		4.18 TB	3.03 TB	tekmkt-test
Provisioning						
Confirmation						
Results						
	<		ш			>
		< Previous	s Next >		Create	Cancel

2. Verify the Storage pool, free space and click **Next**

Þ	New Virtual Disk Wizard						
0	Specify the virtua	l disk nar	ne				
	Before You Begin	Name:	CFWin2012SP1				
	Storage Pool						
	Virtual Disk Name	Description:					

3. Enter a unique virtual disk name and click Next.



Specify the volume provisioning type

È.	New Virtual Disk Wizard
Specify the provi	sioning type
Before You Begin Storage Pool Virtual Disk Name	Provisioning type: Thin The volume uses space from the storage pool as needed, up to the volume size.
Provisioning	○ Fixed
Size	The volume uses space from the storage pool equal to the volume size.
Confirmation	
Results	

4. Select Provisioning type. Thin for the most efficient means of provisioning storage. Click Next.

a	New Virtual Disk Wizard
Specify the size	of the virtual disk
Before You Begin Storage Pool Virtual Disk Name Provisioning	When using fixed provisioning and storage layouts other than simple stripe sets, the virtual disk consumes more free space than the size you specify. By default, Windows creates the virtual disk only if there is sufficient free space. When using thin provisioning, you can create a virtual disk larger than the amount of free space in the storage pool.
Size	Storage pool free space: 23,024 GB
Confirmation Results	Specify size Virtual disk size: 11 GB ▼
	 Create the largest virtual disk possible, up to the specified size Maximum size

5. Select the appropriate unit from the dropdown and enter the appropriate size to contain the .vhdx of the prepared VM.

Note: The unit defaults to TB (Terabyte)



Confirm Virtual Disk details

2	New Vi	rtual Disk Wizard
Confirm selection	S	
Before You Begin	Confirm that the foll	owing are the correct settings, and then click Create.
Storage Pool		
Virtual Disk Name	VIRTUAL DISK LOCATI	ON
Browisioning	Server:	CFSCVMM2K12SP1
Frovisioning	Subsystem:	tekmktlab
Size	Storage pool name:	Ro
Confirmation	Status:	0N 22.5 TP
Results	rree space:	22.3 10
	VIRTUAL DISK PROPER	RTIES
	Name:	CFWin2012SP1
	Description:	This will be our location for the .vhdx
	Storage layout:	RAID6
	Provisioning type:	Thin
	Requested size:	11.0 GB
	UNMASK VIRTUAL DIS	sk
	Initiator Port:	ign.1991-05.com.microsoft:cfscvmm2k12sp1.dm.tme.com
	Servers:	CFSCVMM2K12SP1
	Targets:	Auto iSCSI
		< Previous Next > Create Cancel

6. Review the selections and click Create.

Note: The virtual disk locations indicate the Subsystem (PS Series Group) and Storage Pool (PS Series Pool).



Create the volume

	New Virtual	Disk Wizard	
View results			
Before You Begin	The New Virtual Disk Wi	zard successfully con	npleted.
Storage Pool	Task	Progress	Status
Virtual Disk Name	Gather information	_	Completed
Provisioning	Create virtual disk		Completed
	Unmasking the virtual disk		Completed
Confirmation	Rescan disks		Completed
Results	Initialize disk		Completed
	Update cache		Completed
	Create a volume when this	wizard closes	
		< Previous Nex	t > Close Cancel

7. Be sure the check box is on for "**Create a volume when this wizard closes**" and click **Close** (will prompt for the create volume wizard).

Note: The virtual disk created will create the Dell EqualLogic volume on the PS Series pool specified. The volume from the File and Storage Services perspective is the storage visible to the Operating System and applications.



Verify the disk is present

	New V	olume Wizard		
Select the server	and disk			
Before You Begin	Server:			
Server and Disk	Provision to	Status	Cluster Role	Destination
Size	CFSCVMM2K12SP1	Online	Not Clustered	Local
Drive Letter or Folder				
File System Settings				
Confirmation				
Results				
	Disk			Refresh Rescan
	Disk Vir	tual Disk Capacity	Free Space Su	bsystem
	Disk 12 CF	Win2012SP1 11.0 GB	11.0 GB tel	kmktlab

8. Verify the Virtual Disk (note the Disk number is provided). Click Next.



9. Confirm or adjust the size and click **Next**.



Assign drive letter or folder mount

a	New Volume Wizard
Assign to a drive	letter or folder
Before You Begin Server and Disk	Select whether to assign the volume to a drive letter or a folder. When you assign a volume to a folder, the volume appears as a folder within a drive, such as D:\UserData. Assign to:
Drive Letter or Folder	Drive letter: J
File System Settings	O The following folder:
Confirmation	Browse
Results	O Don't assign to a drive letter or folder.

10. Assign the Drive letter and click Next

<u>a</u>	Nev	w Volume Wizard	_ _ X
Select file system	settings		
Before You Begin Server and Disk Size	File system: Allocation unit size: Volume label:	NTFS Default CEWin2012SP1	▼ ▼
Drive Letter or Folder File System Settings Confirmation Results	Generate short file Short file names (8 applications runnin	names (not recommende characters with 3-charact g on client computers, bu	ed) ter extensions) are required for some 16-bit ut make file operations slower.

11. Enter a volume label and click **Next**.



Verify configuration settings

2	New Volu	me Wizard 📃 🗖 🗙
Confirm selection Before You Begin Server and Disk Size	S Confirm that the followin VOLUME LOCATION Server:	ng are the correct settings, and then click Create.
Drive Letter or Folder	Subsystem:	tekmktlab CEW/=2012SD1
Results	Disk: Free space: VOLUME PROPERTIES Volume size: Drive letter or folder: Volume label: FILE SYSTEM SETTINGS File system: Short file name creation: Allocation unit size:	Disk 12 11.0 GB J:\ CFWin2012SP1 NTFS Disabled Default
		< Previous Next > Create Cancel

12. Confirm the selections and click **Create**. When the results display click **Close** (not shown).







See also Appendix A: "Volume Provisioning through File and Storage Services using PowerShell"



7.4 Add a Share to the volume for SCVMM Library access

The purpose of the volume created in the previous step is to be able to access the virtual hard disk from the SCVMM Library server to create a VM template. The volume must be shared for the SCVMM Library Server to access and manage the virtual hard disk file. For other use cases sharing the volume may be optional.



13. Share the folder by clicking on the new volume "J:" in our case in the **Volumes** panel. Then in the **SHARES** section click **TASKS** and then "New Share..."

Þ		New Share	Wizard
9	Select the profil	e for this share	
	Select Profile	File share profile:	Description:
	Share Location	SMB Share - Quick	This basic profile represents the fastest way to create an
	Share Name	SMB Share - Advanced	SMB file share, typically used to share files with Windows-based computers
	Others Cattioner	SMB Share - Applications	millions based comparers.
		NFS Share - Quick	 Suitable for general file sharing
	Permissions	NFS Share - Advanced	 Advanced options can be configured later by
			using the Properties dialog

14. Click on the appropriate File share profile. For this example "SMB Share –Quick". Then click **Next**.



Select the share location

2	New Share	Wizard			_ □	x
Select the server and	d path for this sha	are				
Select Profile Se	erver:					
Share Location	Server Name	Status	Cluster Role	Owner Nod	2	
Share Name	CFSCVMM2K12SP1	Online	Not Clustere	d		
Other Settings						
Results						
Sł	nare location:					
۲) Select by volume:					
	Volume	Free Space	Capacity File	System		^
	G:\Stagesysprep2k12\LUN1	6.60 GB	15.0 GB NTF	-s		≡
	l:	110 MB	350 MB NTR	FS		
	J:	10.9 GB	11.0 GB NT	-S		\sim
ŕ	The location of the file share w volume.	ill be a new fold	ler in the \Share	s directory on the	selected	
C) Type a custom path:					
					Brows	ie
	[< Previous	Next >	Create	Cano	:el

In the New Share Wizard verify the Volume location and click Next.
 The path will be on the volume just created under the folder named \Shares (default) which will be created through the New Share Wizard.



Choose a name for the share

L		New Share Wizard
Specify share nam Select Profile Share Location Share Name Other Settings Permissions	C Share name: Share description:	CFWin2012SP1 This Share will be for the template volume so SCVMM Library server will be able to access and provision VMs.
Confirmation Results	Local path to share: J:\Shares\CFWin20 I f the folder doe Remote path to sha \\CFVMMonHV1\C	: 12SP1 s not exist, the folder is created. are: FWin2012SP1
		< Previous Next > Create Cancel

16. Provide a share name and click **Next**

Other Settings	✓ Allow caching of share
Permissions	Caching makes the contents of the share available to offline users. If the BranchCache for
Confirmation	Network Files role service is installed, you can enable BranchCache on the share.
	Enable BranchCache on the file share
Results	BranchCache enables computers in a branch office to cache files downloaded from this share, and then allows the files to be securely available to other computers in the branch.
	Learn more about configuring SMB cache settings

17. Leave defaults or make changes as needed then click **Next**.



Customize permissions on the share to allow for the SCVMM Library Server access

Select Profile	Permission	ns to access the files on a sha	are are set using a	combination of folder permissions, s			
Share Location	Location permissions, and, optionally, a central access policy.						
Share Name	Share perr	Share permissions: Everyone Full Control					
Other Settings	Folder per	Folder permissions:					
Permissions	Туре	Principal	Access	Applies To			
Confirmation	Allow	BUILTIN\Users	Special	This folder and subfolders			
Poculte	Allow	BUILTIN\Users	Read & execute	This folder, subfolders, and files			
	Allow	CREATOR OWNER	Full Control	Subfolders and files only			
	Allow	NT AUTHORITY\SYSTEM	Full Control	This folder, subfolders, and files			
	Allow	BUILTIN\Administrators	Full Control	This folder, subfolders, and files			
	Allow	BUILTIN\Administrators	Full Control	This folder only			

18. In the New Share Wizard verify the appropriate Share permissions are set. Click **Next**. Then on the Confirmation Click **Create** and finally **Close** after the share has been successfully created.

6		Server Manager	_ D ×
E	●	nd Storage Services 🔸 Volumes 🔸 🛛 🔹 🕫 🕅 Manage T	īools View Help
II II II I⊗	Servers Volumes Disks Storage Pools Shares iSCSI	L: GoldTemplate2K12 Thin 15.0 G8 6.59 G8 \\?\Volume[faf CFPWR2k8on2k12 Thin 19.5 G8 19.4 G8 G: CF2K12Sysprep0 Thin 15.0 G8 14.9 G8 J: CFWin2012SP1 Thin 11.0 G8 10.9 G8 G:\Stagesyspre GoldTemplate2K12 Thin 15.0 G8 6.60 G8 C: Fixed 99.7 G8 35.1 G8 11 I: System Reserved Fixed 350 M8 110 M8 111.33:34 AM	
		SHARES JA on CFSCVMM2K12SP1 Filter Filter Share Local Path Protocol VMMWin2k12SP1 JASharesVVMMWin2k12SP1 SMB	TASKS

Share is now visible in Windows File and Storage Services in the SHARES section

Note: This share will be later added the SCVMM Library server for SAN Copy capable VM Templates



8 Creating VM Templates

VM Templates provides an efficient means to quickly deploy standardized, approved virtual machines according to the organizations policies and compliance criteria. The ability to create a golden copy of an operating system with predefined hardware and guest operating system profile settings and then provision that copy throughout the infrastructure enables the efficiencies, availability and performance offered by intelligent storage subsystems.

Dell EqualLogic arrays offer the ability to provision new virtual machines using high performing and space efficient Thin Clone technology. Thin Clones are read write links to the original volume (which is referred to as a Template volume) and will contain the changes or differences. On the destination Hyper-V host this Thin Clone will be mounted to the target Dell EqualLogic volume specified and iSCSI connections to the thin clone will be established.

퉬 « CFHV2-VM	► RapidWin2012VM →	•
Name	•	
🛃 LU1		

Figure 5 Example of the mount to the Thin Clone on the destination Hyper-V host



Figure 6 Example of the contents of the mount for the Thin Clone on the destination Hyper-V host

More information on Template volumes and Thin Clones may be found in the document *"Dell EqualLogic Template Volumes and Thin Clones: How and When to Use Them"* <u>http://en.community.dell.com/dell-groups/dtcmedia/m/mediagallery/19861241.aspx</u>



VM template types:

SCVMM has the ability to create both Network copy and SAN Copy Capable VM Templates. SAN Copy capable implies the use of the SAN Subsystem to provision the target virtual machine through a process known as rapid VM provisioning. This will be the technique described in this document because of the efficiencies this method provides. Network copy deployment is also available for Dell Storage solutions however the network and a fully provisioned volume will be used as the delivery mechanism.

VM transfer type usage examples:

Network copy transfer

• To create the blank virtual machine from an ISO will use the Network copy method. An example of this is provided in <u>Appendix B</u> when the staging VM is created.

SAN Copy Capable transfer

• Rapid provisioning of virtual machines whose VM templates resides on Dell EqualLogic storage.

Note: Rapid provisioning describes the underlying process for transferring data when deploying virtual machines. SCVMM only briefly displays "Rapid deploy using SAN copy" during the Create virtual machine operation in the Job viewer.

Step		Name	Status	
۲	⊡ 1	Create virtual machine		81 %
	□ 1.1	Rapid deploy using SAN copy	Completed	

Figure 7 Rapid deploy progress during Create virtual machine

For more information on rapid VM provisioning see the TechNet Library article: <u>http://technet.microsoft.com/en-us/library/gg610594.aspx</u>



Process for creating VM templates on Dell EqualLogic "Template" volumes

- 1. Create a Dell EqualLogic volume on SCVMM using File and Storage Services or EqualLogic Group Manager
- 2. Options to create the gold image virtual hard disk:
 - a. Create a VM from an ISO and Sysprep <u>Click here for steps</u>
 - b. Use an existing virtual hard disk file

Note: The steps below will outline how to create a VM Template with a pre-existing virtual hard disk on a Dell EqualLogic volume.

- 3. Copy a virtual hard disk file (.vhd or .vhdx) to a Dell EqualLogic volume
- 4. Select the method of rapid virtual machine provisioning
- 5. Convert the volume to a Dell EqualLogic "Template" volume
- 6. Share the volume from the SCVMM Management host then add the share to the SCVMM Library server
- 7. Verify the host groups have access to the share
- 8. Create the VM template in SCVMM



Figure 8 Process to Create VM Template on Dell EqualLogic Storage



8.1 Copy the virtual hard disk to the Dell EqualLogic volume on the SCVMM Library server

Below is an example of copying a virtual hard disk between the sources staging volume to the target volume (which is located on the SCVMM server in this demonstration). Once a gold virtual hard disk is available; copy the file (.vhd or .vhdx) to the final location to be used as a VM template.

The process below should be used as an example. The gold VM preparation from an ISO is described in <u>Appendix B</u>.

1. From the SCVMM Server open File Explorer and navigate to the Hyper-V server which has the shared volume containing the golden image of the operating system virtual hard disk.



 Browse to the location of the virtual machine and select the Hard Disk Image file and copy. In this example the vhdx file which is located on the Hyper-v server is \\CFHV2-2012\CFHV2-VMDest\StagingWin2012



 Navigate to the Dell EqualLogic volume that will be used as a Library Server. In this example the library share is located on the SCVMM server "CFVMMonHV1" here: (\\cfvmmonhv1\CFWin2012SP1).

Paste the .vhdx file and monitor the copy process until completion.



The .vhd or .vhdx file should now be located on the SCVMM Library server (in this case the SCVMM server also serves as a library server). The volume is located on the PS Series pool imported previously.



8.2 Select the method of rapid VM provisioning

Dell EqualLogic SMP supports rapid VM provisioning through the use of Thin Clones of template volumes. Since the thin clone contains the differences from the template volume the provisioning method recommended will be to use snapshots.

Note: This use of snapshots in this reference is terminology that Microsoft uses with SCVMM and does not imply using the Dell EqualLogic snapshot or Smart Copy technology.



 Launch SCVMM UI and navigate to the Fabric workspace (1), expand the Storage node, click on Arrays (2). In the Arrays display area right mouse click on the Dell EqualLogic array that is intended to store the virtual machines, right mouse click and then click Properties (3).



	tekmkt-test Properties X
General	Storage array settings
Settings	Select the method that you want to use to create new storage capacity when you use rapid provisioning to deploy new virtual machines.
Storage Pools	 Use snapshots Use if your storage arrays support creating writable snapshots of an existing logical unit that contains the virtual hard disk. This method is fast with very little storage cost. Clone logical units Use this method if your array does not scale well to more than a few snapshots from the same logical unit. A clone is an independent full copy of an existing logical unit. The size of the new logical unit is equal to the size of the original logical unit.

 In the settings tab, make sure the provisioning method is set to "Use Snapshots" for the group intended for rapid provisioning. These storage settings need to be set for each PS Series Group. Specifying snapshots will take advantage of the <u>Dell EqualLogic "Thin Clone"</u> technology for efficient deployment of VMs. Click **Ok**.

Note: "Clone logical units" is not recommended for rapid provisioning using Dell EqualLogic SMP in SCVMM because of the possible performance impact during provisioning and scale limitations due the space needed.

Dell EqualLogic Template Volumes

The process to provision Virtual machines through Dell EqualLogic SANs requires a Read-only "Template" volume which creates linked Read-Write "Thin Clones" for each provisioned virtual machine. The "Template" volume will contain the prepared golden image of the operating system which will act as the source to SCVMM as a SAN Copy Capable VM Template.

The process to convert a volume to a "Template" volume will change the properties of the volume to Read-only so the .vhd or .vhdx file should be completely prepared and in a powered down state before proceeding.

Note: Since SCVMM does not have a native SMP command to convert a Dell EqualLogic volume to a Dell EqualLogic "Template" volume the next steps will have to use either the Dell EqualLogic Group Manager or PowerShell cmdlets.



8.3 Option 1: Convert to "Template" volume with the Dell EqualLogic Group Manager

EqualLogic	Group Manager groadmin Logged in	9/19/13 9:50 AM Log Out
Group tekmkt-test	IP address 10.10.6.170 Access	G Configure mana
Volumes Volumes Replication	Sysiog 1 recipient Sysiog 1 recipient ISCST Authentication Time zone Local CHAP enabled SNMP Settings Ime zone SNMP sccess enabled Uses daylight saving timeyes Access restricted VMware Current group time	NTP servers (in order c

1. Launch the Dell EqualLogic Group Manager and navigate to Volumes



Select the volume to convert, set offline and convert to template

EqualLogic C	Group Manager		<u>grøadmin</u> Lo	gged in 9/19/13 9:50 AM Log Out
Volumes E -	Volume CFWin2012SF	91 Status Access Snaps	shots Replication Collec	tions Schedules Conn
CFHV2vmStorage CFISOsForVMM CFISOsForVMM CFVMILibrary CFVMILibrary CFVMILibrary ForVML2012SP1 ForgV3 ForSto0-vol1 ForSto0-vol2	Volume CFWin Volume Modify settings Clone Set offline Set access type Delete volume	General Volume Informa Status Information of a continue Status	ation General settings Volume name CFWin2012SP1 Reported size12 GB Sector size512 bytes	Replicationdisabled SyncRepdisabled
U1-d7e70523-VMV	Move volume	Volume and Snapshot S	pace	
	Folder Move to folder	Storage pool	syncrep1	
Group Group Volumes	Access Add access policy group Add access policy Add basic access policy	Volume space Reported size	10%	In-use 8.48 GB

- 2. Select the volume created for the template volume. <u>CFWin2012SP1</u> in this example.
- 3. Click on the Set offline under the Activities

	Set volume offline
?	Do you want to set volume CFWin2012SP1 offline?
	Yes No

4. Click Yes for the confirmation warning.



5. Click **Convert to template** then **Yes** to the "Read only..." warning.



Set the volume back online



6. Click **Set Online**. The Access should be enabled to the Microsoft iSCSI initiator for the SCVMM Library server.

The volume is now read only and will need to be re-connected to the host.



Reconnect using the Microsoft iSCSI Initiator

	iSCS	I Initiator Pro	operties		x
RADIUS	Confi	guration	E	Dell EqualLogic MPIO	
Targets	Discovery	Favorite Ta	rgets	Volumes and Devices	
Quick Connect					
To discover an DNS name of t	d log on to a target he target and then o	using a basic cor :lick Quick Conne	nection, ty ct.	pe the IP address or	
Target:				Quick Connect	
Discovered tar	gets				<u>.</u>
	-			Refresh	
				Status	
:0-8a0906-121	f7fa02-89d0015efd	d52420 <mark>cfwin201</mark>	2sp1	Inactive	
:0-8a0906-64a	f7fa02-ca10015ef9	55231d-cfvmmlib	rary	Connected (1)	
:0-8a0906-b8b	f7fa02-8070015adf	150006-cfssdisk1		Inactive	
:0-8a0906-bd3	f7fa02-7f30015adf3	350006-cfssdisk2		Inactive	
:0-8a0906-c0a	f7fa02-0150015adf	550006-cfssdisk3	1	Inactive	
:0-8a0906-eb6	e70b02-451000000	Da4f209-vss-con	trol	Connected	
:0-8a0906-eee	f7fa02-b7f0015efa8	3523a0-template	2k12std	Connected	
<					
To connect usi click Connect.	ng advanced option:	s, select a target	and then	(2) Connect	
To completely then click Disco	disconnect a target, onnect.	select the targe	t and	Disconnect	
For target prop select the targ	perties, including cor et and click Propertie	nfiguration of ses es.	sions,	Properties	
For configurati the target and	on of devices associ then click Devices.	ated with a targe	et, select	Devices	
More about bas	ic iSCSI connections	and targets			
		(ж	Cancel Apply	

7. Launch the Microsoft iSCSI initiator tool select the target (volume) (1) and click **Connect (2)**.

Dél

Set connection parameters

Connect To Target
Target name: =quallogic:0-8a0906-121f7fa02-89d0015efdd52420-cfwin2012sp1
Add this connection to the list of Favorite Targets. This will make the system automatically attempt to restore the connection every time this computer restarts.
Enable multi-path
Advanced OK Cancel

8. Click on **Enable multi-path** then **OK**. If the steps were followed to <u>share this volume</u> previously then the share will be brought back online.

Note: If the volume is not online then use Windows Disk Management or File and Storage Services to bring the disk back online.



8.4 Option 2: Convert to "Template" volume with Dell EqualLogic PowerShell cmdlets

The steps below walk through each PowerShell cmdlet to convert a volume to a read only template volume. For a complete listing of this script please see the PowerShell section in <u>Appendix A</u>.

erShell>	convertto-
	🛐 ConvertTo-Csv
	ConvertTo-EqIDemotedReplicaSet
	🔊 ConvertTo-EqIPromotedReplicaSet
	ConvertTo-EqlTemplateVolume

Figure 9 Intellisense available with Windows ISE

Note: Helpful ability of Windows ISE intellisense to show cmdlet options when only partial strings are entered.

1. Launch the PowerShell ISE

Import-Module -name "C:\Program Files\EqualLogic\bin\EqlPSTools.dll"

2. Import the Dell EqualLogic PowerShell module as shown above

Alternatives: launch the "EqualLogic PowerShell Tools" or use the Dell EqualLogic Group Manager GUI.

```
Get-StorageSubSystem|ft -Property `
Friendlyname,Healthstatus,OperationalStatus -AutoSize
```

Friendlyname	HealthStatus	OperationalStatus
tekmkt-test	Healthy	ОК
Storage Spaces on CFVMMonHV1	Healthy	OK

3. Verify the connectivity to the PS Series group with the "Get-StorageSubSystem" cmdlet above

Note: Get-StorageSubsystem is a Windows Server 2012 PowerShell cmdlet



```
Set-EqlVolume -VolumeName CFWin2012SP1 `
-RaidTypePreference no_raid_type_preference
```

```
Volume 'CFWin2012SP1' changed successfully
```

4. Change the default Raid Preference to "Automatic" with the appropriate modifications to the cmdlet above.

Note: Dell EqualLogic PowerShell cmdlet. Modify the **VolumeName** as needed. The volume here contains the golden virtual hard disk file. See a list of the volumes used in this document <u>here</u>.

When creating the volume through the windows interfaces the "Raid Preference" on Dell EqualLogic volumes will default to Raid 50. A "Raid Preference" of **Automatic** is needed for the creation of Thin Clones.

```
Set-EqlVolume -VolumeName CFWin2012SP1 -GroupName `
tekmkt-test -StoragePoolName syncrep1 -OnlineStatus offline
```

```
Volume 'CFWin2012SP1' changed successfully
```

Note: Dell EqualLogic PowerShell cmdlet. Modify the VolumeName, GroupName and StoragePoolName as needed.

5. Enter cmdlet above with the appropriate modifications to take the Dell EqualLogic Volume offline:

```
ConvertTo-EqlTemplateVolume -VolumeName CFWin2012SP1 -GroupName `
tekmkt-test
```

PSAPI.Cmdlets.ConvertToTemplateVolume CFWin2012SP1 completed successfully.

Note: Dell EqualLogic PowerShell cmdlet. Modify the VolumeName and GroupName as needed.

6. Convert the volume to template with the above cmdlet and necessary modifications.

```
Set-EqlVolume -VolumeName CFWin2012SP1 -GroupName `
tekmkt-test -StoragePoolName syncrep1 -OnlineStatus online
```

Volume 'CFWin2012SP1' changed successfully

Note: Dell EqualLogic PowerShell cmdlet. Modify the VolumeName , GroupName and StoragePoolName as needed.

7. Enter the above cmdlet with the necessary modifications to bring the volume back online for use



```
$initaddress=(get-initiatorport)
$tarport=(get-targetportal)
```

Note: Windows Server 2012 PowerShell cmdlet.

8. Enter the above cmdlets to obtain the Initiator ports to un mask this volume back to the OS

```
$IQN = (Get-VirtualDisk -FriendlyName "CFWin2012SP1" | Get-
TargetPort).NodeAddress
$iSCSISession = Connect-iSCSITarget -NodeAddress $IQN
```

Note: Windows Server 2012 PowerShell cmdlet. Modify the FriendlyName as needed.

 Enter the above cmdlets with appropriate modifications to connect the SCVMM host initiator to the Dell EqualLogic volume (iSCSI Target).

Note: Windows Server 2012 PowerShell cmdlet

```
Show-VirtualDisk -FriendlyName "CFWin2012SP1" `
-TargetPortAddresses $tarport.PortNumber`
-InitiatorAddress $initaddress.NodeAddress
```

Note: Windows Server 2012 PowerShell cmdlet. Modify the FriendlyName as needed.

10. Enter the above cmdlet to bring the volume online

The above process will change the properties of the Dell EqualLogic volume to read-only and allow for links to Thin Clones for each provisioned VM.

8.5 Verify the template volume is shared

The volume containing the virtual hard disk was shared previously during the <u>volume provision through</u> <u>Windows File and Storage Services</u> process. However, if that step was not completed the volume will need to be shared using File and Storage Services, Windows Explorer (traditional method) or PowerShell.

The SCVMM Library Server will need access to this share in order to add the virtual hard disk to the SCVMM catalog for management.



		Server Ma	nager				_
🕑 🕘 🔹 😽 File	and Storage Services	 Volumes 			· 🕲 I	Manage	Tools View
Servers	All volumes 5 total						TASKS
Volumes	Filter	ı م	• 🖲 •				6
 Disks Storage Pools 	A Volume Status	File System Label	Provisioning	Capacity	Free Space	Deduplication Rate	Deduplication Sa
Shares	4 CEV/MMonHV/1 (5)	,					
iSCSI	V?\Volume(96	System Reserved	Fixed	350 MB	109 MB		
	C:	-,	Fixed	127 GB	90.4 GB		
	E:	ShareFor2K12std	Thin	24.9 GB	16.1 GB		
	J:	CFWin2012SP1	Thin	12.0 GB	3.59 GB		
	Ŀ	EQLLibrary	Thin	250 GB	240 GB		
	Last refreshed on 10/4/2013	3:00:40 PM	ш				
	SHARES	Γ		DISK	V8484 LIV/1		TACKC
	Filter		• •	EQLO	OGIC 100E-	00 Multi-Path Di 12.0 GB	sk Device
	Share Local Pat	h		100%	Allocated	12.0 GB	Allocated
	CFWin2012SP1 J:\Shares\	CFWIn20125P1		Status Bus Ta	: Onl	line	Gnanocateu

Verify the Share for the template volume

Figure 10 Share for the template volume

Note: For multiple VM templates the option is available to mount each Dell EqualLogic volume associated with the VM template under a single existing Share. This would allow for several operating systems to use fewer shares.



8.7 Add the template volume as a Library share

The share that contains the golden image of the virtual machine will be added to the SCVMM Library server (in this case the SCVMM server).



1. In SCVMM click on the Library (1) workspace and open the Library Servers (2) and then click the library server which this template volume is shared (in this case CFVMMonHV1). Right mouse click and then click "Add Library Shares" (3).


Add the template volume as a Library share

1		Add Library Shares		X
📑 Add Library Sh	ares			
Add Library Shares	Select library shares to add			
Summary	Share Name	Shared Path	Comment	Add Default Resources
	🔺 🏣 Server: CFVMMor	nHV1.spartan.local		
	CFWin2012SP1	J:\Shares\CFWin2012SP1		
	EQLLibrary	L:\Shares\EQLLibrary		
	MSSCVMMLibrar	C:\ProgramData\Virtual		
	VMMW2k12Stand	E:\		
	Show hidden shares			Aut oninanaged shale
				Next Cancel

2. Check the box next to the share that is the Dell EqualLogic template volume (CFWin2012SP1 in this example). Click **Next**.

Table 2	Storage name	e mapping	for this	section
---------	--------------	-----------	----------	---------

Share name	Volume Label (Drive Letter)	Virtual Disk = Dell EqualLogic Volume name	SCVMM Library Share	Server
CFWin2012SP1	CFWin2012SP1 (J:)	CFWin2012SP1	Yes	CFVMMonHV1

Note: The Windows Virtual Disk is the same name as the volume name on Dell EqualLogic storage.



Add the template volume as a SCVMM Library share

14 C		Add Library Shares	x
is Summary			A
Add Library Shares	Confirm the settings		
Summary	Settings:		
	Property	Value	
	4 Server: Adding libr	ary server shares on CFVMMonHV1.spartan.local	
	CFWin2012SP1	Adding share CFWin2012SP1 for Virtual Machine Manager use	
	Click Add Library Shares to	begin adding the selected shares.	Script
	 In order to add these librar, Manager agent on any new 	y servers and shares, Virtual Machine Manager will install and configure the Virtual Ma w library servers.	chine
		Previous Add Library Shares Ca	incel

3. Click Add Library Shares. The jobs form will show the completed status of this task.

Wait a few minutes or from the Windows ISE execute the PowerShell cmdlet "Update-StorageProviderCache" to refresh the EqualLogic Provider resources.





Verify the library share is present under the SCVMM library servers

 Navigate to the Library (1) workspace on the right then expand the Library Servers (2) and select the appropriate Library Server (CFHVMonHV1 (3) in this example). Right mouse then click Properties (4).





Verify All Hosts have access to the share

CFVMMonHV1.spartan.local Properties						
General Name:	CFVMMonHV1					
Domain:	spartan.local					
Description:	Virtual Machine Manager server as library server					
Host group:	All Hosts	•				
VM networks:	Broadcom BCM57810 NetXtreme II 10 0 LAN1 vSAN-A vSAN-B	Gig •				
Library management credential:	Browse					
Allow unencrypted transfers						
	OK Cancel	L				

5. Be sure that the Library Server has **All Hosts** selected for the **Host Group**. If not drop down the Host group and select **All Hosts** then click **OK**.



Administrator - CFVMMonHV	/1.s	partan.lo	ocal - Virtu	ual Machine Ma	anager			
Home Folder								
Create Service Template Create Service Template Create	Ad	d Library Server Add	Import Template	Import Physical Resource Import	Export Res Ex	Physical ource	Library Settings Settings	 PowerShell Jobs PRO Window
Library Protiles	*	Physical I	Library Obje	cts (1)				
Equivalent Objects			Name		Туре	SAN Co	py Capable	Library Server
a Cloud Libraries		-	StagingWin2	2012_GoldBoot.v	VHDX	Yes		CFVMMonHV1.spartan.local
Seir Service User Content Eibrary Servers Ghv1-2012.spartan.local Ghv1-2012.spartan.local GV HV1_ISOS Stored Virtual Machines and CFVMMonHV1.spartan.local	E							
CFWin2012SP1	4							
CLLIbrary GLIbrary Gli MSSCVMMLibrary Gli Stored Virtual Machines and	Ŧ							
 VMs and Services Fabric 								
🚍 Library								

Verify the virtual hard disk is SAN Copy Capable

Note: The new library share will show up under the **Library** workspace, **Library Servers**. In this example we just added the new share "CFWin2012SP1". The VHDX file that we copied earlier to this Dell EqualLogic volume is now "SAN Copy Capable".

-		
Physical Library Objects (1)	\checkmark	Operating System
	\checkmark	Owner
Name	\checkmark	Status
RapidWindows2012GoldBoot.vbdv	-	Added Date
		Modified Date
		Path
		Cost Center
		Quota Points
		Tag
		Custom Driver Tag
		Capability Profile Compatibility
	\checkmark	SAN Copy Capable
•		Custom1

Note: if the SAN Copy capable column is not visible click in the table grid and right mouse click any column and check the option for "SAN Copy Capable"



8.8 Creating a SAN Copy Capable Virtual Machine Template through SCVMM UI

The "Create VM Template" wizard will prompt through the options to create a virtual machine template with Dell EqualLogic storage.

UHD Tools	Administrator	- CFVMM	onHV1.sp	artan.local	- Virtual Mach	nine Manager
Home Folder VHD						
1			X			
Mark Create Virtual Create VM Equivalent Machine Template	Enable Disable	Open File Location	Delete	Properties		
Create	Actions	Window	Delete	Properties		
Library <	Physical Library C	bjects (1)				
Profiles						
🗊 Equivalent Objects	Name		Т	ype 🕆 SAN	Copy Capable	Library Server
🛁 Cloud Libraries (3)	🧼 Stag	Mark Equiv	alent	Yes		CFVMMonHV1.spartan.local
Self Service User Content		Create Virt	ual Machine	2		
4 讔 Library Servers	(4) 🛅	Create VM	Template			
4 責 cfhv1-2012.spartan.local 😑	•	Enable				
HV1_ISOS	۲	Disable				
🚔 Stored Virtual Machines and	i i i i i i i i i i i i i i i i i i i	Open File L	ocation			
 EVMMonHV1.spartan.local 	×	Delete				
CFWin2012SP1 (2)		Properties				
EQLLibrary		1				
MSSCVMMLibrary	General Inform	nation			Equivalency	/ Information
Stored Virtual Machines and	Name:	1	StagingWin	2012_GoldB	Family Name	2:
w VMs and Services	Description:				Release:	
	Owner:			10/1	Type:	
Fabric	Path:		\\CFVIMI01	nHV I.sparta	Namespace:	Global
🚽 Library 🛑 (1)	Operating syste	em:	Unknown		rielease Time	5

Right mouse click on the SAN Copy capable virtual hard disk (3) and click "Create VM Template"
 (4) or Click on the Create VM Template in the ribbon under VHD tab in the Menu. The Library workspace (1) and appropriate Library Server and Share (2) will need to be selected for this process.



Name the VM Template

•	Create VM Template Wizard	x
🕞 VM Template	e Identity	77
VM Template Identity	VM Template name:	
Configure Hardware	TemplateForRapidVM2K12	
Configure Operating System	Description:	
Configure Applications	this will be the vm template (note this is based on a equallogic template volume) - the VMs created from this will	
Configure SQL Server	- Create a thin clone for each VM - Take up less capacity	
Summary	-Take less time to create	
		_
	Next Cancel	

2. Specify the template name and description then click Next.

Note: The recommendation is to name the template to reflect the organizations naming standards or identity of VM type and function.



Configure settings and verify storage classification.

	Create VM Template Wizard
🕞 Configure Ha	ardware
VM Template Identity	Configure hardware for the virtual machine. You can import settings from a hardware
Configure Hardware	profile or save a new profile based on your settings.
Configure Operating System	Hardware profile: [Default - create new hardware configuration settings]
Configure Applications	🔚 Save as New: 🥪 Disk 💠 SCSI Adapter 🥔 DVD 🗮 Network Adapter 🛛 📉 Remove
Configure SQL Server	Compatibility
Summary	Cloud Capability Pr
	Primary channel (0) (in use)
	1 processor Disk:
	Memory Image: State of the
	Floppy Drive
	No Media Captured O Pass through to physical drive on host
	None VVCFVMMonHV1.spartan.local/VMMWin2k12SP1\Sysprep201 Browse
	The name:
	None Video Adapter
	Default video adap
	Bus Configuration Classification:
	2 Devices attached
	Sysprep2012_d Contains the operating system for the virtual machine
	40.00 GB, Prim
	Previous Next Cancel
Classification:	
syncrep1-tekmkt-t	est
Containenth	antine autom fautho situation dies
Contains the op-	erating system for the virtual machine

3. In the Configure Hardware panel under **Classification** be sure to verify or select the appropriate classification representing the storage. Click **Next**.



Review summary and create the VM Template

B		Create VM Template Wizard
🗊 Summary		
VM Template Identity	Before you create	the new VM template, review the settings that you chose
Configure Hardware	Summary:	
Configure Operating System	Property	Value
Configure Applications	VM Template	TemplateForRapidVM2K12
Configure SQL Server		
Summary		
		🔁 View Script
		template allek Create. You can track the pregress of this jak is the John works
	To create the VM t	emplare, dick create. That can track the progress of this job in the roots workspace.
		Previous Create Cancel

4. Continue through the wizard making changes as necessary until the **Summary** form displays and then click **Create**.



Verify the VM template

History – Rece	ent Jobs (1)								
Last refresh: 9/	20/2013 3:50:2	2 PM							
templatefor									×
Name		Status	Ŧ	Start Time	Ŧ	Result Name		Owner	
🔮 Create te	mplate (Completed		9/18/2013 3:54:5	4 PM	TemplateFor	RapidV	SPARTAN\Admi	nistr.
🕑 Create te	emplate								`
Status:	Completed	Property		Previou	s Valu	e	New Valu	ie	
Command:	New- SCVMTempla	te 🗉 🧫 Vir	tualDis	kDrive - Template	ForR	apidVM2K12			
Result name	: TemplateForF	Ra Name		(none)			Template	ForRapidVM2K12	
	pidVM2K12	Owner		(none)			SPARTAN	l\Administrator	
Started:	9/18/2013	BUS		(none)			0		
Duration	3:54:54 PM	Target		(none)			0		
Owner:	SDARTAN	🗆 🎁 Ha	rdware	Profile - Tempora	ary H	ardware Conf	igba5d82	17-0fff-454e-bf1	I
owner.	\Administrate	or Name		Tempor III	arv Ha	ardware Co	(none)	•	*



5. View the template just created under **Library**, **Templates**, **VM Templates** (note: this example indicates a filter for the template name)



See also <u>Appendix A</u>: "<u>Creating a SAN Copy Capable Virtual Machine Template using PowerShell</u>"



Rapid Provisioning VMs on Dell EqualLogic arrays

9

Dell EqualLogic arrays can create copies of virtual disks very efficiently with minimal load on the host. SCVMM integration with Dell EqualLogic arrays leverages this capability to rapidly create virtual machines. When a virtual hard disk (.vhd or .vhdx) for a VM template is residing on a Dell EqualLogic Storage volume, SCVMM identifies the VM template as SAN Copy Capable. VM Templates that are SAN Copy capable will use the SAN Transfer method as opposed to network transfer improving performance and efficiency. On a Dell EqualLogic array the SAN Transfer method will communicate through the Dell EqualLogic SMP to create a "Thin Clone" which will be a Read-Write volume which will contain only the changes to the original Dell EqualLogic Template volume. SCVMM then exposes the storage to the host, mounting the file system, and associating the virtual hard disk to the virtual machine.

The following general steps are needed to create a Rapid Provisioned VM.

- 1. Create an operating system gold image or use an existing virtual hard drive that has been generalized. This VM will reside on Dell EqualLogic storage. <u>Appendix B</u> shows how to create a VM from an ISO image.
- 2. Create a VM template based on the prepared image (this may be stored in the default library server or other server as appropriate). The virtual hard disk (.vhd or .vhdx file) will need to be on the Dell EqualLogic array. See the previous steps to create a SAN Copy Capable <u>VM Template</u>.

Note: The Dell EqualLogic Template volume should only contain one VHD or VHDX to provision.

The gold image virtual hard disk should be located on the <u>VMM Library Server</u> after the OS has been customized and configured.

3. Create the virtual machine through the wizard or PowerShell and select a unique VM name, Hyper-V host or cluster to deploy the VM and the target volume for the VM to reside.



Figure 11 Process to Create a SAN Copy Capable VM



9.1 Rapid Provisioning of Virtual Machines through SCVMM UI

1. Launch the SCVMM UI

B	Template Tools	Administrator -	CFVMMonH	V1.spartan.lo	ocal - Virt	ual Machine M	anager 🕒
Home Folder	Template						
1	• •	X					
Create Virtual Create VM Machine Template	Enable Disable E	xport Delete	Properties				
Create	Actions	Delete	Properties				
Library	< Ten	nplates (1)					
Templates	(2)						
Profiles		Name		SAN Copy	Туре	- Owner	Status
		II TemplateForRapidVM2K12		Yes	VM Templa	ate SPARTAN\A	ОК
🚺 Equivalent Objects		(7)					
씈 Cloud Libraries		(3)					
🧮 Self Service User Content		TownlateForDenid//M2//12					
🔺 辴 Library Servers	_	I remplateror rapid v M2K12					
🔺 轟 cfhv1-2012.spartan.loca	al	General Information					
HV1_ISOS	-	Seneral Information	211				
Stored Virtual Machin	nes and Se	Name:	Templa	ateForRapid			
Why and Services	1	Type:	VM Ter	mplate			
	C	Description:	this wil	l be the vm			
🗓 🤇 Fabric			is base	aplate (note this lased on a			
🗮 Library	(1)		equallo volume	ogic template e)			

 Navigate to the VM Templates (not visible) under Library (1)-> Templates (2). Click on the SAN Copy template created earlier (3) and click Create Virtual Machine (4) in the Template Ribbon



Specify a virtual machine name

•	Create Virtual Machine Wizard				
E Specify Virtual Machine Identity					
Specify Virtual Machine Identity	Virtual machine name:				
Configure Hardware	RapidWin2012VM				
Configure Operating System	Description:				
Select Destination	Create a VM based on a PS Series template volume				
Select Host	- uses the SAN infrastructure as opposed to the Network				
Configure Settings					
Add Properties					
Summary					
	The virtual machine name identifies the virtual machine to VMM. The name does not have to match the computer name of the virtual machine. However, using the same name ensures consistent displays in System Center Operations Manager.				
	Next Cancel				

3. Enter a unique virtual machine name (optionally description) and click **Next**.



Configure settings

•	Create Virtual Machine Wizard
🕞 Configure Ha	rdware
Specify Virtual Machine Identity	Configure hardware for the virtual machine. You can import settings from a hardware
Configure Hardware	profile or save a new profile based on your settings.
Configure Operating System	Hardware profile: [Default - create new hardware configuration settings]
Select Destination	🔚 Save as New: 🥪 Disk 💠 SCSI Adapter 🥪 DVD 🗮 Network Adapter 📉 Remove
Select Host	Compatibility Sysprep2012_disk_1.vhdx
Configure Settings	Cloud Capability Pr
Add Properties	Primary channel (0) (in use)
Summary	1 processor
	512 MB = (\CFVMMonHV1.spartan.local\VMMWin2k12SP1\Sysprep201) Browse
	Floppy Drive
	Mo Media Captured Maximum size: 40.00 GB
	None Currently expanded to: 8.64 GB
	1 СОМ 2
	None Classification:
	Default video adap
	Bus Configuration
	2 Devices attached
	Ca TemplateForRa
	40.00 GB, Prim
	Previous Next Cancel

4. In the Configure Hardware wizard verify the classification is pointing to the storage pool intended. Click **Next** and fill out the Configure Operating system parameters as needed.



Select destination



5. Select Place the virtual machine on a host option and verify destination is All Hosts.



Choose a host

•	Create Virtual Machine Wizard			X
🔚 Select Host				
Specify Virtual Machine Identity	Select a destination for the virtual machine			
Configure Hardware	Destinations are rated based on the virtual machine requirements and on	the default placen	nent options.	
Configure Operating System	Expected Utilization			
Select Destination				
Select Host		🔎 v in All H	osts	~
Configure Settings	Rating Destination	Warnings	Transfer Type	Network
Add Properties	☆☆☆☆☆☆ ■ cfhv1-2012.spartan.local		SAN	J
Summary			_	
	Placement has finished calculating ratings for each potential destination Solution Details Obscription Status OK Operating system Microsoft Windows Server 3 Virtualization software Microsoft Hyper-V Virtualization coffeene attric Up to date	n of this virtual mac n 2012 Datacenter	hine.	
	Virtualization sortware status Up-to-date Virtual machines Sysprep2012			
]	1			
		Previous	Next	Cancel

6. Select the destination Host and verify the **Transfer Type** is **SAN**, Click **Next**.

R Th	eview the virtual machine e following values will be used who	settings en the new virtual machine is created:
*	Locations Virtual Machine Location	Library resource: Sysprep2012_disk_1.vhdx File size: 8.64 GB
*	Operating System Settings Identity Information RapidWin2012VM	Deployment options
* *	Networking Machine Resources	Transfer the virtual hard disk by using the SAN 👻 - 🚚
	Virtual Hard Disk Sysprep2012_disk_1.v	Transfer the virtual hard disk by using the network Transfer the virtual hard disk by using the SAN Use the virtual hard disk that exists at the destination



Select VM storage destination

•	Create Vi	rtual Machine Wizard	x
Configure Se	ttings		
Specify Virtual Machine Identity Configure Hardware Configure Operating System Select Destination Select Host Configure Settings Select Networks Add Properties Summary	Review the virtual machine The following values will be used wh Locations Virtual Machine Location Virtual Machine Location Rapid/M2K12 X Networking Machine Resources Virtual Hard Disk Sysprep2012_disk_1.v	en the new virtual machine is created: Specify the storage location on the host for the virtual machine files. Virtual machine path: V: Add this path to the list of default virtual machine paths on the host Select Destination Folder Browsing cfhv2-2012.spartan.local C	

7. Configure the destination path if needed and continue through the wizard making appropriate choices for the network and any additional properties.

Note: The destination volume may contain multiple VMs; however consider the impact on performance, capacity and iSCSI Session counts. Each thin clone will act as an individual volume with its own iSCSI sessions, therefore will need to be considered for situations where many VMs are deployed within the same PS Series Pool (a pool may have a maximum of 1024 iSCSI sessions established).



Finish the process

I	Crea	ate Virtual Machine Wizard
🗊 Summary		
Specify Virtual Machine Identity Configure Hardware	Confirm the settings	
Configure Operating System	Summary:	Value
	Virtual machine	RapidWin2012VM
Select Destination	Destination host	cfhv2-2012.spartan.local
Select Host	Path	VA
Configure Settings		
Select Networks		
Add Properties		
Summary		
	Start the virtual machine	after deploying it 📃 View Script
	To create the virtual m	achine, click Create. You can track the progress of this job in the Jobs workspace.
		Previous Create Cancel

8. Click **Create** to provision the virtual machine to the target Hyper-V server

St	ep		Name	Status	Start Time	End Time
		⊡ 1	Create virtual machine	81	% 9/20/2013	
		= 1.1	Rapid deploy using SAN copy	Completed	9/20/2013	9/20/2013
	Ø	□ 1.1.1	Parallel execution step	Completed	9/20/2013	9/20/2013
	Ø	1.1.1.1	Creates new storage logical unit	Completed	9/20/2013	9/20/2013
	0	1.1.2	Registers Storage Logical Unit to h	Completed	9/20/2013	9/20/2013
	0	□ 1.1.3	Parallel execution step	Completed	9/20/2013	9/20/2013
	0	1.1.3.1	Mounts storage disk on cfhv2-2012	Completed	9/20/2013	9/20/2013
		1.2	Create virtual machine	Completed	9/20/2013	9/20/2013

Note: "Rapid deploy using SAN Copy" will create a new linked thin clone for the virtual machine deployed.



9.2 Thin Clone creation monitoring

The following optional steps will simply demonstrate the behind the scenes processing of Template volumes and Thin Clones.

EqualLogic Gr	oup Manager				<u>grpadmin</u>	Logged
🔋 Volumes 🛛 🔳 🔻 🚺	🗸 Template CFWin20	012SP1			<u>@</u>	
Group tekmkt-test	Status Access	Snapshots	Replication	Schedules	Connections	Thin
CFSTORSPACES CFSTORSPACES	Thin Clones Summ Thin clones Demoted thin clones Combined saved space .	nary 2 13.05 GB				
CFHV2vmStorage CFISOsForVMM	Thin clone		Shared space	Reported size	Status	
FogV3	Thin Clones U1-89185844 Ra	aidWin2012VM MOnHV2W2k12			11 GB O online 11 GB O online	

1. Launch the EqualLogic Group Manager GUI click on the template volume (under volumes workspace) and then the Thin Clones tab. Notice the new name suffix reflects the VM just provisioned (RapidWin2012VM).



The **Shared space** is the unchanged data from the Template volume (with the VHD or VHDX). Notice that the **In-use** is only 2.12GB while the **Shared space** is 6.58GB.



9.3 Provisioned Virtual Machine customization

SCVMM allows the administrator to manage the provisioned VMs without having to switch to the Hyper-V management console.

	Server Tools	Virtual Machine Tools	Administrat	tor - CFVM	MonHV1.s	partan.lo	cal - Vir	tual Machi	ne Manag	ger L		x
Home Folder	Host	Virtual Machine										^ 🕑
Create Create	Power Off 🧣 Pause 🔓 Resume 🏅	Reset Save State Discard Saved State Virtual	Aligrate Sto Migrate Virt Store in Libi Machine	rage :ual Machine rary	Create Checkpoint	Manage Checkpoin	C 📕	Connect or View • Window	Delete Delete	Properties Properties		
VMs and Services	<	VMs (1)										
🥵 Tenants		rapid										×
Clouds		Name	Status 👕	Virtua 👻	Ava Host	t Clo J	lob Statu:	5	т О. т	U CP	Ser	Ор
J. VM Networks		腸 RapidWin2012VN	A Stopped	Stopped	cfhv	с	ompleted	i	SPA	Ad 0 %		64
 Storage All Hosts cfhv1-2012 												
ill cfhv2-2012		RapidWin2012VI	M									*
w VMs and Services		Virtual machine in Status: Stopper Owner: Processors: 1	formation	Log	gical networ	ks		Recer Name Job st	nt job : Creat atus: 100 %	e virtual mach 6 Completed	ine	-

2. **Power on** the VM, and **Connect or View** to continue through the login process to make any additional customizations to the VM. You may perform these actions easily through the SCVMM UI.



See also Appendix A: "Rapid Provisioning of Virtual Machines using PowerShell"



10 Migration

SCVMM allows for resource optimization on Dell EqualLogic storage by relocating virtual resources such as virtual machines between clusters, to and from a cluster and a stand-alone Hyper-V host or between standalone Hyper-V hosts. Storage migration is also available to re assign, move or distribute available Dell EqualLogic storage to maximize efficiencies.

For more information see the Microsoft TechNet library for the article on "*Migrating Virtual Machines and Storage Overview*" <u>http://technet.microsoft.com/en-us/library/jj628158.aspx</u>

10.1 VM Migration

In a cluster on which VM is already running, SCVMM will use Live Migration to move VM resources across cluster nodes.

SAN migration will be used across different clusters or standalone hosts, and will be enabled if the access to the PS Series group for the template volume is correctly configured on the target host.

Note: With SAN Migration the VM is saved on the source host and restored on the target host.

The ability to migrate a particular VM depends on the availability setting and the properties of the target host (standalone or cluster node). See the Microsoft TechNet article for more information: http://technet.microsoft.com/en-us/library/jj628163.aspx





1. Launch the SCVMM UI



Select the virtual machine to migrate



To migrate "RapidWin2012VM" on cfhv2-2012 to cfhv1-2012 click on the VM to migrate (3).
 VMs and Services (1) and the Hyper-V host for the source virtual machine (2) should be selected prior to this operation.





Select the Migrate Virtual Machine wizard

3. With the source virtual machine selected, Right mouse click and then click "Migrate Virtual Machine"



Select the target host to migrate the virtual machine to

•	Migrate VM Wizard	E EULIEUES	x
Select Host			
Select Host	Select a destination for the virtual machine		
Select Path	Destinations are rated based on the virtual machine requirements and on th	e default placeme	nt options.
Select Networks	Expected Utilization 🔲 Make this VM highly available		
Summary	Search P v in All Hosts		~
	Rating Destination Warnin	Transfer Type	Netwo
	★★★★★ ■ (current nos) = cur2=2012.spartan	SAN	v
	Placement has finished calculating ratings for each potential destination of	f this virtual mach	ine.
	⊗ Details		
	Details Rating Explanation Storage Area Network (SAN) Explanation		
	Description		^
	Status OK Operating system Microsoft Windows Server 2012 Datacen	ter	~
	Previous	Next	Cancel

4. Click on the Target Hyper-V server (or cluster) for the new location of the VM. Click **Next**.

Note: Status and Ratings will indicate that the template volume is configured correctly (the hyper-v host has access to the storage pool).



Select path for the virtual machine configuration files

•	Migrate VM Wizard	X
Select Path		
Select Host	Select storage locations on the host for the virtual machine files	
Select Path	Selected host: cfhv1-2012.spartan.local	
Select Networks		_
Summary	Storage location for VM configuration:	
	Select Destination Folder X Browsing cfhv1-2012.spartan.local 	

5. Select the appropriate storage location for the virtual machine configuration. Continue through the wizard until the move option is available and click **Move** (not shown).



Hist	History – Recent Jobs (240)						
Last	refresh: 9/20/2013 5:37:12 PM						
							ر
	Name	Status	~	Start Time	Ŧ	Result Name	Owner 👻
۲	Deploy virtual machine		50 %	9/20/2013 5:37:0	B PM	RapidWin2012VM	SPARTAN\Administr
Ø	Refresh virtual machine	Completed		9/20/2013 5:29:3	2 PM	RapidWin2012VM	SPARTAN\cfvmm
0	Start virtual machine	Completed		9/20/2013 5:24:1	9 PM	RapidWin2012VM	SPARTAN\Administr
Ø	Create virtual machine	Completed		9/20/2013 4:51:5	3 PM	RapidWin2012VM	SPARTAN\Administr

() Move virtual machine RapidWin2012VM from cfhv2-2012.spartan.local to cfhv1-2012.spartan.local using SAN

Status:	50 %	Step		Name	Status	Start Ti	End Ti
Command:	Move-		⊡ 1	Move virtual machine Ra	50 9	6 9/20/2	
Result name	ScvirtualMachine RapidWin2012VM	0	1.1	Run pre checks for transfer	Completed	9/20/2	9/20/2
Started:	9/20/2013 5:37:08 PM	0	1.2	Change virtual machine s	Completed	9/20/2	9/20/2
Startear		0	1.3	Export Hyper-V virtual m	Completed	9/20/2	9/20/2
Duration:	00:00:05	0	1.4	Deploy file (using LAN)	Completed	9/20/2	9/20/2
Owner:	SPARTAN	۲	1.5	Deploy file (using SAN tr	50 %	6 9/20/2	
	\Administrator		1.6	Import Hyper-V virtual m	Not started		
			1.7	Remove virtual machine	Not started		
			10	Change properties of not	Not started		

Status of the move virtual machine job

E Server Tools	Virtual Machine Tools Administrator - CFVMMonHV1.spartan.local - Virtual	Machine Manager 📃 🗕 🗙
Home Folder Host	Virtual Machine	^ @
Create Create Virtual Cloud Group Service Machine - Cloud Group Create	Create VM Network Cloud Cloud Show VM Services VM Cloud Show VM Networks VM Window VM	
VMs and Services <	VMs (1)	
ổ Tenants	rapid	×
a Clouds	Name Status Virtua Varu. Host Clo Job Status	▼ 0. ▼ U. ▼ CP Ser Op
L VM Networks	KapidWin2012VM Running Running cfhv Completed	SPA Ad 0 % 64
🧧 Storage		
All Hosts		
<pre>cfhv2-2012</pre>	RapidWin2012VM	~ ~
	Virtual machine information Logical networks	Recent job
	Status: Running Owner:	Name: Change properties of virtual machine
WMs and Services	Processors: 1	Job status: 100 % Completed

Cfhv1-2012 is the new location of the VM (the destination Hyper-V server).



10.2 VM Storage Migration

Virtual machine storage migration provides the ability to move storage from one location to another without interrupting the workload of the virtual machine. Storage on standalone hosts may be moved to clustered hosts and between standalone hosts.

For PS Series arrays storage migration is also available between a CSV volume to a different CSV volume, or from a non-CSV volume to a CSV volume.

- B Server Tools Virtual Machine Tools Administrator - CFVMMonHV1.spartan.local - Virtual Machine Home Folder Host Virtual Machine O Power Off O Reset 🔒 Migrate Storage Q 0 Pause 🔚 Save State 🗊 Migrate Virtual Machine Shut Create Manage Create Power Connect Resume 🖓 Discard Saved State 🛛 🚍 Store in Library Down On Checkpoint Checkpoints or View • Create Virtual Machine Window < VMs (1) VMs and Services rapid 🥵 Tenants Name Status 🕆 Virtua... Ava... Host Clo. Job Status a Clouds RapidWin2012VM_Ru Rupping cfhv... Completed (3) J VM Networks * Create 0 길 Storage Shut Down ሀ Power On 🔺 🚞 All Hosts n Power Off Ref all 2012 Pause cfhv2-2012 ₽ Resume P Reset ical networks Vir 📊 Save State Recent i Sta 🟠 Discard Saved Stat Name: (4) Migrate Storage Ov . WMs and Services Job statu Migrate Virtual Machine Prc 🧊 Store in Library Me 🚍 H. 🕄 Fabric 1 Create Checkpoint 📕 Library æ Manage Checkpoints Go 🞧 rage (1 disks) Daily pe 🗄 Jobs Refresh Ho 🛥 I storage (40.00 GB): Repair Settings Install Virtual Guest Services B used Connect or View CFVMMonHV1 Servers: X Delete Volumes: E:.L:J: Properties
- 1. Launch the SCVMM GUI.

Select the Hyper-V host (2) which contains the source VM to migrate the storage. Under the list of VMs, right click on the virtual machine (3) from the VM and Services (1) workspace and click Migrate Storage (4).



Select the New storage location

Image: Migrate Storage Wizard		
Select Path		
Select Path Summary	Select storage locations on the host for the virtual machine files Selected host: cfhv1-2012.spartan.local Storage location for VM configuration:	
⇒	 Add this path to the list of default storage locations on the host Automatically place all VHDs with the configuration Allow Select Destination Folder X 	
	Browsing cfhv1-2012.spartan.local cfhv1-2012.spartan.local C:\[107.40 GB free of 134.08 GB] C:\[107.40 GB free of 349.88 GB] C:\[107.40 GB free of 199.88 GB] C:\[107.40 GB free of 199.88 GB] C:\[107.40 GB free of 199.88 GB] C:\[107.40 GB free of 15.00 GB, SAN (Migration Capable)] C:\[109 GB] C:\[109 GB] C:\[109 GB] C:\[109 GB] C:\[109 GB free of 15.00 GB, SAN (Migration Capable)]	

3. Verify the "Automatically place all VHDs with the configuration" option is selected and Browse and select the appropriate new volume or folder.



Move the storage

8	Migrate Storage Wizard	x
Summary		
Select Path Summary	Before you migrate the virtual machine to the new host, review the settings that you chose View Scriet Virtual machine: RapidWin2012VM Source host: cfhv1-2012.spartan.local Destination host: cfhv1-2012.spartan.local	pt
	 Start the virtual machine after deploying it To migrate the virtual machine, click Move. You can track the progress of this job in the Jobs workspace. 	
	Previous Move Cancel	

4. Review the inputs and click **Move**

Step		Name	Status	Start Time	End Time
	⊟ 1	Move virtual machine RapidWin2012VM from cfhv1-2012.sparta	33 9	6 9/20/2013	
0	1.1	Run pre checks for transfer	Completed	9/20/2013	9/20/2013
0	1.2	Change virtual machine status	Completed	9/20/2013	9/20/2013
0	⊡ 1.3	Create checkpoint	Completed	9/20/2013	9/20/2013
0	1.3.1	Create checkpoint	Completed	9/20/2013	9/20/2013
0	⊡ 1.4	Create checkpoint	Completed	9/20/2013	9/20/2013
0	1.4.1	Create checkpoint	Completed	9/20/2013	9/20/2013
	1.5	Deploy file (using BITS over HTTP): 5 of 6 files (3.55 GB/9.01 GB)	39 9	6 9/20/2013	

5. Monitor the progress in Job status for a successful completion.



11 Conclusion

Dell EqualLogic Host Integration Tools for Microsoft® along with Auto-Snapshot Manager Microsoft® Edition (ASM/ME) provide robust integration and management capabilities for Dell EqualLogic storage and Microsoft Windows environments. The exercises in this document should provide some guidance on how Dell EqualLogic storage environments may be used along with Windows Server 2012 and Systems Center Virtual Machine Manager 2012 SP1 to offer improved efficiencies, optimization and performance on Dell EqualLogic arrays.



A PowerShell automation and scripts

Dell EqualLogic provides advanced automation with Windows Server 2012 and SCVMM 2012 SP1. In addition Dell EqualLogic specific PowerShell cmdlets are also available with the Host Integration Tools for Microsoft® and provide advanced manipulation of the PS Series arrays.

The flexibility for PowerShell has provided an easy way to automate day to day tasks. The objective of this Section is to show the SCVMM and File and Storage Services functionality described earlier with PowerShell scripts and cmdlets.

 Table 3
 Types of PowerShell cmdlets represented in this document

Type of PowerShell cmdlet	Module Source
Windows Server 2012	Storage Module, iSCSI module (included)
System Center Virtual Machine Manager 2012 SP1	Virtual Machine Manager module (lic required)
Dell EqualLogic PowerShell Tools	EqualLogic PowerShell module (included with HIT)

PowerShell modules may be imported into Windows ISE for convenience with the following similar commands:

Dell EqualLogic PowerShell Tools:

Import-Module -name "PathToEQLInstall\EqlPSTools.dll"

Note: Typically the path is "C:\Program Files\EqualLogic\bin\"

System Center Virtual Machine Manager:

```
Import-Module 'C:\Program Files\Microsoft System Center Virtual Machine Manager
2012\bin\virtualmachinemanager.psd1'
```

```
All PowerShell cmdlets are provided as reference only and imply no warranty or support.
Please consider testing in non-production environments.
Please modify the variables and scripts appropriately.
```



Configuring PS Series Group access using PowerShell

Source: Dell EqualLogic PowerShell Tools

New-EqlGroupAccess -Groupname <groupname> -GroupWKaddress <WellKnownIPaddress> MgmtWKAddress <GroupManagementIP> -username <DOMAIN>\<username> -password
<password> -VSSUserName <chapuserforvss> VSSPassword <chappassword>

Typical example:

```
$GroupName= 'MyEQLGroup'
$GroupMgmtIP='xxx.xxx.xxx' #Group management IP
$GroupIP= 'xxx.xxx.xxx' #Well-Known IP of the Group
```

New-EqlGroupAccess -GroupName \$GroupName -GroupWKAddress \$GroupIP -MgmtWKAddress \$GroupMgmtIP -UserName MyGroupADMIN -Password MyAdminPass

Importing the SMP provider for EqualLogic using PowerShell

Source: Windows Server 2012 modules, System Center Virtual Machine Manager 2012 SP1 – virtual machine manager module

```
#Shows the Group just registered - verify the group is connected
Get-StorageSubSystem
#Imports the Dell EqualLogic SMP Provider defaults to all Storage providers
registered on the SCVMM server
Import-SCStorageProvider
#Refreshes all the cache for the storage provider
Update-StorageProviderCache
```

```
#Change Name and Description as needed
New-SCStorageClassification -Name "MyPoolGroupID" `
  -Description "PS Pool: syncrep1 PS Array: tekmkt-test" -RunAsynchronously
```



Volume Provisioning through SCVMM using PowerShell

Source: System Center Virtual Machine Manager 2012 SP1 Virtual Machine Manager Module

```
# Create a volume through SCVMM - modify for your environment
$MyVMM="MyVMMonHV1"
$NewVolName="MySCPWRSHELL"
$LookupPoolName ="MyPool"
$ThisEQLGroup = "MyGroup"
$TargetHV="MyTargetHV"
$VOLLABEL="Demo SCVMM LUN"
$DriveLetter="Z:\"
#set communication to the SCVMM server
Get-VMMServer -ComputerName $MyVMM
#if more than one array will need to specify unique parameter options
$mySCArray=Get-SCStorageArray -Name $ThisEQLGroup
#now we need to be sure of the Pool...be aware of default with multiple groups!
foreach ($i in ($myscarray.storagepools))`
{
if ($i.Name -eq $LookupPoolName)
{
$PoolID=$i.id;
$PoolName=$i.SMDisplayName; `
Write-host "This is the PoolID:" $PoolID " the PoolName:" $PoolName;`
 }
}
#now that we found the pool (caution must be unique)
$pool=get-scstoragepool -Name $PoolName -ID $PoolID #be sure this is
unique...or use PoolID fro get-scstoragepool
$newLun=New-SCStorageLogicalUnit -StoragePool $pool `
-DiskSizeMB 81920 -Name $NewVolName -Description "created completely from
SCVMM" -ProvisioningType "Thin" -RunAsynchronously
#pass the host group ID if necessary $hostGroup = Get-SCVMHostGroup -ID
"0e3ba228-a059-46be-aa41-2f5cf0f4b96e" -Name "All Hosts"
$hostGroup = Get-SCVMHostGroup -Name "All Hosts"
#Assigns the Lun to the SCVMM server
```



```
Set-SCStorageLogicalUnit -StorageLogicalUnit $newLun -VMHostGroup $hostGroup
#Get the hyper-v host information
$vmHost=Get-SCVMHost -ComputerName $TargetHV
$logicalUnits = @()
$logicalUnits += Get-SCStorageLogicalUnit -ID $newLun.ID -name $newLun.Name
$JobGroup = [Guid]::NewGuid().ToString()
#connect the iSCSI Session to the target host
Register-SCStorageLogicalUnit -StorageLogicalUnit $$$ Provide the storageLogicalUnit $$$ Provide the storageLogicalUnits $$$ Provide the storageLogicalUnit $$ Providet
-JobGroup $JobGroup
#Please mount your ponies
$lun = Get-SCStorageLogicalUnit -ID $newLun.ID -Name $newLun.Name
Mount-SCStorageDisk -MasterBootRecord -QuickFormat -VolumeLabel $VOLLABEL -
StorageLogicalUnit $lun `
   -JobGroup $JobGroup -MountPoint $DriveLetter #"Z:\"
Set-SCVMHost -VMHost $vmHost -JobGroup $JobGroup -RunAsynchronously
write-host "Volume create on $TargetHV please review the job $jobgroup in SCVMM
```

```
Volume Provisioning through File and Storage Services using PowerShell
```

Source: Windows Server 2012 modules

or login to that server"

```
$NewVolName="MyVol"
#This is the group that should have been initialized
# connect-eqlgroup or new-eqlgroupaccess should have already been performed
$ThisEQLGroup = "MyGroup"
#will create a thin volume with capacity specified
$useable = "10GB"
#Specify minimium free GB before allocating volumes
$MyPool = "MyPool"
#One time grabs for the initiator port
$initaddress=(get-initiatorport)
$tarport=(get-targetportal)
```

#The following checks may be consider for later use



```
$GroupIsOK= get-storagesubsystem -FriendlyName $ThisEQLGroup -ErrorAction
SilentlyContinue
$PoolIsOK = get-storagepool -FriendlyName $MyPool -ErrorAction SilentlyContinue
New-VirtualDisk -FriendlyName $NewVolName -Size 10GB -ProvisioningType Thin -
StoragePoolFriendlyName $MyPool
Write-Host "Now adding the masking set to allow for this volume to be accessed
to by Server:" $initaddress NodeAddress " to " $ThisEQLGroup
New-MaskingSet -StorageSubSystemFriendlyName $ThisEQLGroup -VirtualDiskNames
$NewVolName -InitiatorAddresses $initaddress NodeAddress
#The Show-VirtualDisk cmdlet makes a virtual disk available to a host (by
initiator and target ports).
Show-VirtualDisk -FriendlyName SNewVolName -TargetPortAddresses
$tarport PortNumber -InitiatorAddress $initaddress NodeAddress
Write-Host "Now we will refresh the iscsi initiator which may take a few
minutes.."
#Below will take a considerable time for many targets....
##Update-IscsiTarget
#The alternative is to update the portal...much more efficient
#This will work if only one target portal is available...check iSCSI Initiators
GUI on the
# "Discovery" tab
Get-iSCSITargetPortal | Update-iSCSITargetPortal
Write-Host "Now we will connect each new volume to this host:"
$initaddress NodeAddress " to " $ThisEQLGroup
Start-Sleep -Seconds 10
Write-Host "Connecting" $initaddress NodeAddress " to " $NewVolName
#Get the target node address
$IQN = (Get-VirtualDisk -FriendlyName $NewVolName | Get-TargetPort).NodeAddress
if ($iqn.count -gt 1) { `
$iqn=$iqn[0];`
write-host $iqn; }
$iSCSISession = Connect-iSCSITarget -NodeAddress $IQN
$disk= ($iSCSIsession| Get-Disk)
initialize-disk -InputObject $disk
#partition and assign the next available drive letter
$partition = New-Partition -InputObject $disk -UseMaximumSize -AssignDriveLetter
```


```
#format the volume for access
Format-Volume -Partition $partition -FileSystem NTFS -NewFileSystemLabel
$NewVolName -Confirm:$false
$MyPath=$partition.DriveLetter + ":\"
#Setup Share (modify as needed)
New-SmbShare -Name $NewVolName -Path $MyPath
write-host "volume: $NewVolName Created on $initaddress.NodeAddress"
```

Note: Volumes created through Windows native user interfaces such as SCVMM UI or the File and Storage Services will default the Raid Preference of the volume to Raid 50. This will need to be modified to "Automatic" through the EqualLogic Group Manager or PowerShell cmdlet as demonstrated <u>here</u>.

Convert to Template volume using PowerShell

Source: Dell EqualLogic PowerShell Tools Windows Server 2012 Modules

```
#VMM library for template
#Build a little script to convert a volume and bring it back to windows
#Setup variables
$MyEQLVol ="MyVHDVolume"
$MyEQLGroup="MyGroupName"
$MyEQLPool="MyPoolName"
$initaddress=(get-initiatorport)
$tarport=(get-targetportal)
#First we must take the volume offline- its ok the data will stay
Write-Host "Taking $myeqlvol offline"
Set-EqlVolume -VolumeName $MyEQLVol -GroupName `
$MyEQLGroup -StoragePoolName $MyEQLPool -OnlineStatus offline
#Now we can convert to a template volume
Write-Host "converting $myeqlvol to a read-only template volume"
ConvertTo-EqlTemplateVolume -VolumeName $MyEQLVol -GroupName $MyEQLGroup
#Bring this template volume online
Write-Host "bringing the $myeqlvol online to the group"
Set-EqlVolume -VolumeName $MyEQLVol -GroupName
$MyEQLGroup -StoragePoolName $MyEQLPool -OnlineStatus online
#Show this volume back to the os
```



\$IQN = (Get-VirtualDisk -FriendlyName \$myEQLVol | Get-TargetPort).NodeAddress \$iSCSISession = Connect-iSCSITarget -NodeAddress \$IQN #will see connected in iSCSI Initiator tool

Write-Host "Showing volume \$myeqlvol back to the OS"
Show-VirtualDisk -FriendlyName \$myEQLVol -TargetPortAddresses
\$tarport.PortNumber`
-InitiatorAddress \$initaddress.NodeAddress

#Convert to template will change the color of the volume icon to blue in EqualLogic Group Manager to indicate readonly #will enable the ability to create linked thin clones (contains changes only) #every Rapid provisioned VM will have an associated thin clone

Creating a SAN Copy Capable Virtual Machine Template using PowerShell

Source: System Center Virtual Machine Manager 2012 SP1 Virtual Machine Manager Module



```
New-SCVirtualScsiAdapter -VMMServer localhost -JobGroup $JobGroup -AdapterID 7 -
ShareVirtualScsiAdapter $false -ScsiControllerType DefaultTypeNoType
New-SCVirtualDVDDrive -VMMServer localhost -JobGroup $JobGroup -Bus 1 -LUN 0
New-SCVirtualNetworkAdapter -VMMServer localhost -JobGroup $JobGroup -
MACAddressType Dynamic -Synthetic -EnableVMNetworkOptimization $false
Set-SCVirtualCOMPort -NoAttach -VMMServer localhost -GuestPort 1 -JobGroup
$JobGroup
Set-SCVirtualCOMPort -NoAttach -VMMServer localhost -GuestPort 2 -JobGroup
$JobGroup
Set-SCVirtualFloppyDrive -RunAsynchronously -VMMServer localhost -NoMedia -
JobGroup $JobGroup
$CPUType = Get-SCCPUType -VMMServer localhost | where {$ .Name -eq "3.60 GHz
Xeon (2 MB L2 cache)"}
New-SCHardwareProfile -Name $HWProfile -Owner $Owner `
-Description "Temporary hardware profile used to create a VM Template" -MemoryMB
512 `
-JobGroup $JobGroup
$StorageClassification = Get-SCStorageClassification -VMMServer localhost |
where {$ .Name -eq $MyStorClass}
$VirtualHardDisk = Get-SCVirtualHardDisk -VMMServer localhost | where
{$ .Location -eq $vhdloc}
New-SCVirtualDiskDrive -VMMServer localhost -IDE -Bus 0 -LUN 0 -
StorageClassification $StorageClassification -JobGroup $JobGroup -
VirtualHardDisk $VirtualHardDisk -VolumeType BootAndSystem
$HardwareProfile = Get-SCHardwareProfile -VMMServer localhost | where {$ .Name -
eq $HWProfile}
$OperatingSystem = Get-SCOperatingSystem -VMMServer localhost | where {$ .Name -
eq $vhdos}
$template = New-SCVMTemplate -Name $vmtemplatename -RunAsynchronously -
HardwareProfile $HardwareProfile `
 -JobGroup $JobGroup -ComputerName "*" -TimeZone 35 -
LocalAdministratorCredential $null
  -FullName "" -OrganizationName "" -Workgroup "WORKGROUP" -AnswerFile $null -
OperatingSystem $OperatingSystem
write-host "VM Template: $template.name created successfully "
```



Rapid Provisioning of Virtual Machines using PowerShell

Note: Due to the complexity of this process only a summary of the main PowerShell cmdlets will be provided.

Source: System Center Virtual Machine Manager 2012 SP1 Virtual Machine Manager Module

```
Function RapidDeployVM([String]$vmName, [String]$hostName,
[String] $templateName, [int] $vmCount, [String] $vMMIn, [String] $vhdxLocation)
# Get the VM template information
$template = Get-SCVMTemplate -VMMServer $vmmserver | where {$ .Name -eq
$templateName}
#Get the SCVMM server information
$mvHost = Get-SCVMHost -ComputerName $hostName
#Create the new VM Configuration
$vmc = New-SCVMConfiguration -VMTemplate $template
$vhdc = $vmc.VirtualHardDiskConfigurations
$vhdc | Set-SCVirtualHardDiskConfiguration -DeploymentOption UseSAN
$voidobj = Set-SCVMConfiguration -VMConfiguration $vmc -Name $currentVmName -
ComputerName $currentVmName -VMHost $myHost -VMLocation $vhdxLocation
$vm = New-SCVirtualMachine -VMConfiguration $VMCArray[$i-1] -Name $currentVmName
-SkipInstallVirtualizationGuestServices -JobVariable "RapidCreateVM"
-RunAsynchronously
```

```
\# Further logic will be needed however the main cmdlets are demonstrated above <math display="inline">\}
```



How to prepare a gold copy of an operating system using the SCVMM user interface

This section will walk through the process to create a virtual machine from an ISO then use that as the source for the VM Template. This step may be skipped if a generalized virtual hard disk is already available. Once a prepared VHD or VHDX is ready, copy to a Dell EqualLogic volume and convert that volume to a "Template" volume as outlined in this <u>document</u>.

The ultimate goal of this procedure is to create the virtual hard disk (VHDX) for the virtual machine Template. New with Windows Server 2012 is the VHDX format which is described below along with the previous virtual hard disk version.

VHD (Virtual Hard Disk) is a file format that represents a hard disk image. A VHD file is composed of sectors of 512 bytes each, and addressed by a 32-bit table which allows a maximum addressable size of 2TB (or 2040GB). VHD format is supported by all three generations of Microsoft Hyper-V technologies since Windows Server 2008, as well as other virtualization platforms. VHDs can only be mounted on NTFS/ReFS volumes (not FAT/FAT32), and should not be placed within a compressed folder or volume.

VHDX (Virtual Hard Disk eXtended) is the VHD enhanced file format representing a hard disk image, and is supported only on the latest generation of Microsoft Hyper-V in Windows Server 2012. VHDX format supports storage capacity up to 64TB by using 4KB sectors and provides protection against data corruption during power failure by logging changes in its own metadata structures. VHDX also supports reclaiming unused space ("unmap/trim") when working in combination with Dell EqualLogic firmware 6.0 (and up) and provides better disk alignment with an increased offset of 1MB (from 512Kb).

Note: Both VHD and VHDX are supported with Hyper-V 2012.

General steps for creating the virtual hard disk:

- 1. Create a Dell EqualLogic volume on the library server for ISOs (disk images) and copy the appropriate ISOs to this volume
- 2. Add the ISOs as a Library share to the SCVMM Library Server
- 3. Create a VM from that ISO
- 4. Generalize through Sysprep
- 5. Remove the ISO



•	cfh	v1-2012.spartan.local Properties
General	Storage	move
Status Hardware	Disk	Create Logical Unit
Host Access	\\.\PHYSIC 136.13 GB (\\.\PHYSIC)	Specify the settings for the new logical unit
Virtual Machine Paths	200.01 GB	Storage pool: syncrep1
Reserves Storage	350.01 GB	Available capacity: 3,056.51 GB Allocation percentage: 52 %
Vi <mark>rtual Swit</mark> ches	(),\PHYSIC 15.00 GB ()	Name: HV1_ISOS Description:
Migration Settings	\\.\PHYSIC 80.01 GB (
Placement	🚙 New Volur	Size (GB): 200 ♀ © Create thin storage logical unit with capacity committed on demand
Servicing Windows	□ iSCSI Arrays	Create a fixed size storage logical unit with capacity fully committed
Custom Properties	4,278.68 G	View Script OK Cancel
View Script		OK Cancel!

Example of creating a volume to contain ISOs through SCVMM

1. Create an EqualLogic volume and bring the volume online to the SCVMM Library Server and share the volume. In this example the CFHV1-2012 server is also a library server. The Library server may also be the same as the SCVMM server, a stand-alone server or a VM. For an example of using SCVMM to create a volume for the ISOs see the using SCVMM to provision volumes <u>section</u>.

Note: The folder created from the SCVMM Library Server should be shared with Full Control permissions for "system" required to allow SCVMM 2012 SP1 to manage this share.

2. Launch SCVMM UI





3. Click on the Library workspace, expand Library Servers, right-click on the desired library server and select Add Library Shares



1		Add Library Share	5	X
📑 Add Library Sł	nares		Alle	
Add Library Shares	Select library shares to add	1		
Summary	Share Name	Shared Path	Comment	Add Default Resources
ouninary	🔺 🔚 Server: cfhy 1-2	2012.spartan.local		
	HV1_ISOS	E:\Shares\HV1_ISOS		
	Show hidden shares			Add Unmanaged Share
				Next Cancel

4. Check the box next to the library share to add and then **Next**. This library will contain the Operating Systems ISO files.



1		Add Library Shares
is Summary		
Add Library Shares	Confirm the settings	
Summary	C-Win-ri	-
	Propertu	Value
	Server: Adding I	library server shares on cfhy1-2012.spartan.local
	HV1_ISOS	Adding share HV1_ISOS for Virtual Machine Manager use
	Click Add Library Share	res to begin adding the selected shares.
	 In order to add these lil Manager agent on any 	ibrary servers and shares, Virtual Machine Manager will install and configure the Virtual Machine y new library servers.
		Previous Add Library Shares Cancel

5. On the Summary page click "Add Library Shares"



Administrator - CFVMMonH ^V	/1.spartan.l	ocal - Virtual Machine Man	ager				– – X
Home Folder							^ (
Create Service Template Create VM Create Create	Add Library Server Add	Import Template Import Physical Import	Export Physical Resource Export	Library Settings	 PowerShell Jobs PRO Window 		
Self Service User Content		ary Objects (4)		· · · · ·			<u>م</u>
 Library Servers Chyl-2012 spartan.local HV1_ISOS Stored virtual Machines a CPVMMonHV1.spartan.loca EQLLibrary MSSCVMMLibrary VMMWin2k12SP1 Stored Virtual Machines a Orphaned Resources VMs and Services Fabric Library Jobs Settings 	Na 20 SC SQ en	me 12 R2 PreRelease /MM2012 L Server windows_server_2012_x64_dvd	Type SA No No No ISO Image No	N Copy Capat	cfhv1-2	Server Stat	sus N., O., F., O.,
							.4

Library Share view in SCVMM

Note: The ISO library share will be used to create a new VM from a blank virtual hard disk.



	Server Tools Ad	m	
Home Folder	Library Server		
🖄 👘 🗄	斧 불	Cfhv1-2012	spartan.local Properties
Create Service Create VM C Template Template	reate Add Library Server	General	
Create	Add	Name:	cfhv1-2012
Library	 Physical Libra 	Domain:	spartan.local
Self Service User Content		Description:	This is our Library for ISOs as well as hyper-v used for rapid vm provisioning
 Library Servers 	Nam		
Cfhv1-2012.	Library Shares		
HV1_ISOS	resh	Host group:	All Hosts
🔺 🏣 CFVMMonH 💻 🛛 Rer	nove	VM networks:	Readcom BCM57810 NetVtreme II 10 Gi
🧮 EQLLibrary 🚟 🛛 Pro	perties		
MSSCVMMLibrary			└─ vSAN-A
VMMWin2k12SP1			VSAN-B
🖺 Stored Virtual Machi	nes a		< <u>Ⅲ</u> →
Orphaned Resources		Library management credential:	Browse
N 🕞 H. J. L. C. L. L. J. D		Allow unencrypted transfers	
🔯 VMs and Services			
Fabric			OK Cancel
📕 Library			

6. On the library Server verify that the host group or **"All hosts"** are assigned. In the Library workspace expand **Library Servers** then right mouse click on the appropriate library server then click **Properties**. The Host group dropdown should have **All Hosts** selected.



Create a blank VM from an ISO image

The procedure below is provided to demonstrate how to create a VM from an ISO image using a blank virtual hard disk.

The resulting VM may then be:

- Patched
- Customized
- Generalized
- Powered down

Then the virtual hard disk (.vhd or .vhdx) may be moved or copied to a Dell EqualLogic volume which will then be converted to a template volume for rapid VM deployment.



Create Virtual Machine

E Server Too	Administrator - CFVMMonHV1.spartan.local - Virtual M	a 🗕 🗖 🗙
Home Folder Host		^ 🔞
Create Virtual Service Create Virtual Machine - Create Virtual Machine	st Create VM Network Cloud Cloud Show	 PowerShell Jobs PRO Window
VMs and T Convert Physical Machine	/Ms (1)	
Tenants	cfvm	×
a Clouds	Name A. H. C. Job Status	C. S. O
🛃 VM Networks	D Crymmonny i ku kun c Completed	1. 0
ј Storage		
▲ Cfhv1-2012		~
🔯 VMs and Services		
🔮 Fabric		
📕 Library		
🗐 Jobs		
Settings		
·		ti

- 1. Click **Create Virtual Machine** on the Home tab of the ribbon bar –be sure to navigate to **All Hosts** then the target Hyper-V server selected in the **VMs and Services Workspace**.
- 2. Create Virtual Machine from the dropdown to start the wizard



•	Create Virtual Machine Wizard
🕞 Select Source	
Select Source Specify Virtual Machine Identity Configure Hardware Select Destination Select Cloud Add Properties Summary	Select the source for the new virtual machine. Use an existing virtual machine, VM template, or virtual hard disk. Treate the new virtual machine with a blank virtual hard disk
	be stored in the library.

3. Click "Create the new virtual machine with a blank virtual hard disk" then Next.



•	Create Virtual Machine Wizard								
Specify Virtual Machine Identity									
Select Source	Virtual machine name:								
Specify Virtual Machine Identity	StagingWin2012								
Configure Hardware	Description:								
Select Destination	This VM will be used to stage our VM to be used as a gold image.								
Select Cloud									
Add Properties									
Summary									
	The virtual machine name identifies the virtual machine to VMM. The name does not have to match the computer name of the virtual machine. However, using the same name ensures consistent displays in System Center Operations Manager.								
	Previous Next Cancel								

4. Enter a descriptive unique machine name (this VM will be named StagingWin2012), optionally a description then click **Next**.



•	Create Virtual Machine Wizard
🕞 Configure Ha	ndware
Select Source Specify Virtual Machine Identity Configure Hardware	Configure hardware for the virtual machine. You can import settings from a hardware profile or save a new profile based on your settings.
Select Destination Select Cloud Add Properties Summary	Image: Save as New: Disk SCSI Adapter DVD Network Adapter Remove Image: Sove as New: Disk StagingWin2012_GoldBoot Image: Cloud Capability Pr Image: StagingWin2012_GoldBoot Channel: Image: Processor Image: Processor Image: Staging Vin2012_GoldBoot Image: Processor Image: Staging Vin2012_GoldBoot Image: Staging Vin2012_GoldBoot Image: Staging Vin201 Image: Staging Vin2012_GoldBoot Image: Staging Vin2012_GoldBoot Image: Staging Vin201 Image: Staging Vin2012_GoldBoot Image: Staging Vin2012_GoldBoot Image: Staging Vin201 Image: Staging Vin2012_GoldBoot Image: Staging Vin2012_GoldBoot Image: Staging Vin201 Image: Staging Vin2012_GoldBoot Image: Staging Vin2012_GoldBoot Image: Staging Vin201 Image: Staging Vin2012_GoldBoot Image: Staging Vin2012_GoldBoot Image: Staging Vin201 Image: Staging Vin2012_GoldBoot Image: Staging Vin2012_GoldBoot Image: Staging Vin201 Image: Staging Vin201 Image: Staging Vin201 Image: Staging Vin201 Image: Staging Vin201 Image: Staging Vin201 Image: Staging Vin201 Image: Staging Vin201 Image: Staging Vin201
	Previous Cancel

5. Configure the hardware (optionally use an existing profile), select **Create a new virtual hard disk**, increase the size to match the OS plus room to contain the ISO image.

Warning: Please do not click next until the steps below are completed.



E	Create Virtual Machine Wizard	X
🗊 Configure Ha	ardware	7
Select Source Specify Virtual Machine Identity	Configure hardware for the virtual machine. You can import settings from a hardware profile or save a new profile based on your settings.	
	Hardware profile: [Default - create new hardware configuration settings]	×
Select Destination	🔚 Save as 🛛 New: 🥪 Disk 💠 SCSI Adapter 🥔 DVD 🔍 Network Adapter 🛛 🗙 Remove	
Select Cloud	Cloud Capability Pr	
Add Properties	★ General	_
Summary	Processor Channel:	1
		1
	512 MB Media	-
	Floppy Drive 🗧 🔿 No media	
	No Media Captured O Physical CD or DVD drive	
	COM 1 One Existing ISO image file:	
	TOTAL INCOMENTATION IN THE INFORMATION INTERVALUE INFORMATION IN THE INFORMATION IN THE INFORMATION INTERVALUE INTER	
	None	
	Select	150
	Bue Configuration Select the CD image to be inserted in DVD drive	
	2012 X V in	
•	2 Devices attached	
	StagingWin201 4 Type: ISO Image	
	75.00 GB, Pim 9431.0.WINMAIN BLUEMP.130615-1214 X64FRE SERV.	
	en_windows_s V 9477.0.FBL PARTNER OUT31.130803-0736 X64FRE SE	
	en_sql_server_2012_enterprise edition x86 x64 dvd 81.	
	en windows server 2012 x64 dvd 915478.iso	
	KB3AIK EN.iso	
	mu autor conter 2012 uirtual machine manager wi	

- 6. Under **Bus Configuration**, click the **Virtual DVD drive** then under **Media** click **Existing ISO image file** and browse to the ISO "library" share created earlier.
- 7. Select the Windows Server 2012 ISO (of course this will need to have the appropriate license and copied to the ISOs share prior to this action)

		Pr	evious	Next	Cancel

8. Click on **Next** when finished with the Configure Hardware settings





9. Select the deployment option of **Place the virtual machine on a host** and the destination of **All Hosts** to show the available hosts. Click Next.



	C	reate Virtu	al Machine Wizard			X
🗊 Select Host						
Select Source	Select a destination	on for the v	virtual machine			
Specify Virtual Machine Identity	Destinations are rated ba	sed on the vir	ual machine requirements and c	on the default place	ment options.	
Configure Hardware	Expected Utilization					
Select Destination		_				
Select Host	Search			P v in All	Hosts	×
Configure Settings	Rating	Destination	1 2012 spartan local	Warnings	Transfer Type	Network
Add Properties		cfhv1-	2012.spartan.local		A Network	
Summari						
	Placement has finished	calculating rat	ings for each potential destinations for each potential destinations are a compared to the second structure of the second stru	on of this virtual ma	chine.	
	Description					^
	Status		ОК			
	Operating system		Microsoft Windows Serve	r 2012 Datacenter	,	
	Virtualization softw	are	Microsoft Hyper-V			=
	Virtualization softw	are status	Up-to-date			
	Virtual machines		Boeing2003, CFVMMonH	/1, RapidWin201	2VM	
						~
				Previous	Next	Cancel

10. Click the Hyper-V host connected to the EqualLogic staging volume. In this example the Hyper-v host is cfhv1-2012. Click **Next**.

Note: The Transfer Type for this virtual machine will use the Network



Select Source Specify Virtual Machine Identity Configure Hardware Select Destination Select Host Configure Settings Select Networks Add Properties Summary Provide 134.08 GB1 C:\107.37 GB free of 134.08 GB1 C:\107.37 GB free of 134.08 GB1 Select NetWork2 (1.1) [15.77 GB free of 15.00 GB1 StoreMigrate [1:\1][5.77 GB free of 15.00 GB1 Explore directory OK Cancel	E Configure Set	Create \	/irtual Machine Wizard
	Select Source Specify Virtual Machine Identity Configure Hardware Select Destination Select Host Configure Settings Select Networks Add Properties Summary	Review the virtual machin The following values will be used v Virtual Machine Location S:1 Networking Machine Resources Virtual Hard Disk	He settings when the new virtual machine is created: Specify the storage location on the host for the virtual machine files. Virtual machine path: Si Add this path to the list of default virtual machine paths on the host Select Destination Folder X Browsing cfhv1-2012.spartan.local ChV1-2012.spartan.local ChV1-2012.spartan.local ChV1-2012.spartan.local ChV1-2012.spartan.local StoreWing (ChV1-2012.spartan.local ChV1-2012.spartan.local ChV1-2012.spartan.local ChV1-2012.spartan.local StoreWing (ChV1-2012.spartan.local StoreWing (ChV1-2012.spartan.local)

11. On the configuration settings under **Locations**->**Virtual Machine location**, click browse for the "Virtual Machine path" and select the volume intended for this Gold image (S: in this example) on the target Hyper-V server.

Note: Migration Capable should be indicated.





12. Under **Machine Resources** click on the **Virtual Hard Disk** icon and browse to the location used use as the source for the gold template or image.



•	Create V	irtual Machine W	Vizard	X
Select Source Specify Virtual Machine Identity Configure Hardware	ttings Review the virtual machine The following values will be used wi Locations Content of the second sec	e settings nen the new vitual mad	chine is created:	
Select Destination	S:	Deployment option	S	
Select Host	Machine Resources	Method to deploy	the virtual hard disk to the host:	
Select Networks Add Properties Summary		Deployment details Destination path: File name:	S.1 Browse StagingWin2012_GoldBoot	异 9 月
			Previous Next Car	ncel

13. Click Next

Note: Continue through the Wizard and customize as appropriate.



	Cre	eate Virtual Machine Wizard
🗊 Summary		
Select Source	Confirm the setting	s
Specify Virtual Machine Identity	Summaru	- -
Configure Hardware	Property	Value
Select Destination	Virtual machine	StagingWin2012
	Destination host	cfhv1-2012.spartan.local
Select Host	Path	S/\
Configure Settings	Operating System	64-bit edition of Windows Server 2012 Standard
Select Networks		
Add Properties		
Summary		
	Start the virtual machin	e after deploying it 🗾 🔀 View Script
	 To create the virtual 	machine, click Create. You can track the progress of this job in the Jobs workspace.
		Previous Create Cancel

Note: On the Summary form you may optionally **View Script** to see the System Center PowerShell cmdlets used to build the virtual machine

14. Click Create



Administrator - CFVMMonHV1.s	partan.local - Virtual Machine	Manager				x
Home					^	0
Refresh Load More Results Date Fi	Last 30 Days	el PowerShell				
Jobs <	History – Recent Jobs (276)					
Running	Last refresh: 9/24/2013 3:49:39 PM					
E Hirton						۶
Enistory	Name	Status	 Start Time Result 	lt Name	Owner -	-
	Create virtual machine		29 % 9/24/2013 3:49:36 PM Stag	ingWin2012	SPARTAN\Administr	. 🔺
	Update the placement settings	of Completed	9/24/2013 3:48:14 PM Stag	ingWin2012	SPARTAN\Administr	
	Ø Modify existing Virtual Hard Di	sk d Completed	9/24/2013 3:48:13 PM		SPARTAN\Administr	
	Ø Modify existing VM deployment	nt c Completed	9/24/2013 3:48:13 PM Stag	ingWin2012	SPARTAN\Administr	
	Update the placement settings	of Completed	9/24/2013 3:42:07 PM Stag	ingWin2012	SPARTAN\Administr	
	Ø Modify existing VM deployment	nt c Completed	9/24/2013 3:42:07 PM Stag	ingWin2012	SPARTAN\Administr	. •
	Create virtual machine					~
	Status: 29 %	Step	Name	Status	Star End	
	Command: New-		Create virtual machine		29 % 9/24	
	SCVirtualMachine	1.1	Create virtual machine	Completed	9/24 9/24.	
WMs and Services	Started: 9/24/2013 3:49:36	1.2	Deploy file (using BITS over HTTF):	47 % 9/24	
B Fabric	PM	1.3	Change properties of virtual mac	hiNot started		
	Duration: 00:00:06	1.4	Fix up differencing disks	Not started		
🚍 Library	Owner: SPARTAN	⊡ 1.5	Create new VirtualDiskDrive with	nNot started		
📋 Jobs	\Administrator	1.5.1	Deploy file (using LAN)	Not started		
Settings						
Ť	Summary Details Change Trackin	ŋ				.d

Figure 12 Job status viewed in the Jobs display



Server Too	Administrator - CFVMMonHV1.spartan.local - Virtual Machine Manager
Home Folder Host	^ @
Create Create Virtual Create Create Ho Service Machine - Cloud Group Create	ist Create VM Network Cloud Cloud Cloud Show Services VM Services VM Networks Cloud Show Services VM Networks VM Networks VM Networks VM Networks VM Networks VM
VMs and Services <	VMs (1)
💖 Tenants	stag
a Clouds	Name Status Vir., V A., Host C. Job Status V C. S. O
🛃 VM Networks	StagingWin2012 Stopped Stopped cfhv1-2012 Completed S A 6.
Storage	
A 🚆 All Hosts	
■ cfhv1-2012	
🗊 cfhv2-2012	
	۲. () () () () () () () () () (
	· · · · · · · · · · · · · · · · · · ·
w VMs and Services	
💱 Fabric	
📕 Library	
📋 Jobs	
Settings	
•	h.

Note: Once the Create virtual Machine job completes, verify that the new guest VM is displayed under the target host in the VMs and Services workspace. In this example the new guest is listed under the host server cfhv1-2012 as shown.



Configure the VM created from the ISO image

On the new guest complete the following:

•	Server Tools Virtual Machine Tools Administrator - CFVMMonHV1.spartan.local -	Virtual Machine Manager
Home Folder	Host Virtual Machine	^ @
Create Create	Power Off Reset Migrate Storage Pause Save State Migrate Virtual Machine Resume Discard Saved State Store in Library Virtual Machine	Connect or View • Window Delete Properties
VMs and Services	< VMs (1)	
🥵 Tenants	stag	×
a Clouds	Name Status 🕆 Vir 🕆 A Host	C. Job Status - C. S. O
J VM Networks	h StagingWin2012 Running Running cfhv1-2012	Completed S A 6
Storage		
iii cfhv2-2012		
	۰ (III) III / I	4
	StagingWin2012	~
	Virtual machine information Logical networks Status: Running Owner:	Recent job Name: Start virtual machine Iob status: 100 % Completed

1. Click Power On from SCVMM process ribbon

8		Server Too	Is Virtual Machine Tools	Administrator -	CFVMMonHV1.s	partan.local - V	irtual Machine Manager		x
Home	Folder	Host	Virtual Machine						^ 🕜
Create Create Create	Power On	Power Off Pause Resume	Reset Save State Discard Saved State Virtua	🔒 Migrate Storage Migrate Virtual M Store in Library Machine	Machine Create Checkpoint	Manage Checkpoints	Connect or View • Connect via Console	operties rties	
VMs and Services		<	VMs (1) stag				Connect via RDP		×
i Clouds			Name StagingWin2012	Status Running	Vir Vir A	Host cfhv1-2012	C. Job Status Completed	▼ ▼ ▼ (S A	C. S. O . 6.
Storage All Hosts Chyl 2012 Chyl 2012									
₩ cmv2-2012			StagingWin2012			III			•
			Virtual machine info	ormation	Logical networks		Recent job Name: Start virtual n	nachine	_
WMs and Serv	vices		Owner: Processors: 1				Job status: 100 % Compl	eted	

2. Connect to the VM via the console in SCVMM



	Server To	ools Virtual Machine Tools Administrator - CFVMMonHV1.spartan.local - Virtual Machine Manager	
Home Fold	er Host	Virtual Machine	^ 🔞
Create Create	Power Off Pause Resume	f Reset Baye State Save State Tritual Machine Virtual Machine Virtual Machine	
VMs and Services	<	· VMs (1)	
ổ Tenants		stag	×
a Clouds		Name Status 🕆 Vir 🕆 A Host C. Job Status 🏹 🏹	- C. S. O
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Storage		Virtual Machine Viewer - StagingWin2012 on server cfhv1-2012.spartan.local	~ ~
4 C All Hasts	File	Action	
R cfhv1-2012	:		
<pre>cfhv2-2012</pre>			
		de Mindows Satura	
		Windows Setup	
		Windows Server 2012	
w VMs and Services	_		
Fabric		Language to install (English (United States)	
📕 Library		Ecyboard or input method, US	
E lobr			
- JODS		Enter your tanguage and other preferences and click. Next: To continue.	
Settings		Next	

3. Install the OS (may need the appropriate license keys)





Virtual Machine Vie	wer - StagingWin2012	on server cfhv1-2012.spartan.local	_ 🗆 🗙
File Action			
🕴 🍪 Ctrl-Alt-Del 👘 💆 Full Scre	en		
ñ.	Serve	r Manager	_ 0 ×
Server Manag	er • Dashboard	<u>•</u> 🕄 🚩 Manag	e Tools View Help
Dashboard WEL	COME TO SERVER MANAGER		Ê
E Local Server	CK START CK START C Config C CK START C Add ATS NEW C Crea Add ATS NEW C Crea C Crea C C C C C C C C C C C C C C C C C C C	roles and features other servers to manage te a server group	Hide
		· · · ·	1:35 PM 9/24/2013

Server Manager Dashboard of gold image virtual machine

Complete the gold image virtual machine installation:

- Install any desired features, roles or applications
- Customize any settings
- Patch to desired level



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File Home Sha	are View	Manage							^ 🕜
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ⓒ ⊚ ▾ ↑ 퉺 🖸	\Windows\Syste	m32\Sysprep			Ý	Ċ	Search Sysprep		P
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🖳 Recent places	퉬 Panth	er			8/30/2013 7:33 AN	Л Fi	le folder		
	🚰 syspre	p			7/25/2012 8:08 PN	1 A	pplication	398 KB	

Sysprep tool location

System Preparation Tool 3.14
System Preparation Tool (Sysprep) prepares the machine for hardware independence and cleanup.
System Cleanup Action
Enter System Out-of-Box Experience (OOBE) V
Generalize
Shutdown Options
Shutdown 🗸
OK Cancel

Sysprep Tool

- 4. Sysprep the system to generalize the OS for deployment. Check the "Generalize" box and select **Shutdown** from the "Shutdown Options" and Click **OK**.
- 5. After the new guest has been fully staged, power it down.



Remove the ISO from the Virtual Machine



1. Right click on the new guest VM under VMs and Services and click Properties



General	H Save As Network Adapter Sust Adapter South Adapter
Status Hardware Configuration	★ General ^ Processor 1 processor 1 processor Channel: Memory Secondary channel (0) (in use)
Checkpoints	Floppy Drive Media
Custom Properties	COM 1 = O No media None O Physical CD or DVD drive
Settings	COM 2 O Existing ISO image file:
Actions	Wideo Adapter S:\StagingWin2012\en_windows_server Browse Default video ad To share an image file may require additional
Servicing Windows	Bus Configuration Configuration Configuration Configuration
Dependencies	2 Devices attach
Validation Errors	75.00 GB, Pri
Access	No Media Ca SCSI Adapter 0 Devices attach Network Adapters You can link a virtual DVD drive to a physical CD or DVD drive, or to an ISO image file.

2. On the **Hardware Configuration** action under **Bus Configuration** click on **Virtual DVD**. Click on the "No Media" option then OK.

Table 4 ISC	O Space usage				
StagingWin2012		StagingWin2012			
Type: Local Disk File system: NTFS			Type: Local Disk File system: NTFS		
Used space:	12,745,711,616 bytes	11.8 GB	Used space:	9,050,529,792 bytes	8.42 GB
Free space:	73,162,018,816 bytes	68.1 GB	Free space:	76,857,200,640 bytes	71.5 GB
Capacity:	85,907,730,432 bytes	80.0 GB	Capacity:	85,907,730,432 bytes	80.0 GB
Used Space Before ISO is removed (11.8GB)			Used Space After ISO is removed (8.42 GB)		
This is the amount needed for the gold template volume on the library server (in this case the SCVMM server).					



Note: If the ISO is not removed, then it will become part of the template, and this ISO will be copied over the LAN from the library server to the target host(s) for every new guest deployed from it. The result would be SAN space consumed unnecessarily, along with possible negative impact to network bandwidth.

For the next steps with this Staging virtual machine see the Creating VM templates section where the <u>Copy the virtual hard disk to the Dell EqualLogic volume</u> is described.

