



Technical Report

Best Practices and Implementation Guide for NetApp SMI-S Agent 5.1

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Abstract

In Microsoft® System Center Virtual Machine Manager (SCVMM) 2012 R2, you can discover, classify, and provision remote storage on supported storage arrays through the VMM console. VMM fully automates the assignment of storage to a Hyper-V® host or Hyper-V host cluster and tracks the storage that is managed by SCVMM. To enable the new storage features, SCVMM 2012 R2 uses the new Microsoft Storage Management Service to communicate with the external arrays through a Storage Management Initiative Specification (SMI-S) Agent. The Storage Management Service is installed by default during the installation of SCVMM 2012 R2. You must install a supported SMI-S Agent on an available server and then connect the agent to SCVMM 2012 management. The NetApp® Data ONTAP® SMI-S Agent helps to manage NetApp storage systems by using SCVMM 2012 R2.

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1 Overview

The NetApp Data ONTAP SMI-S Agent allows administrators to manage and monitor NetApp FAS storage systems through open-standard protocols and classes as defined by two organizations:

- Distributed Management Task Force (DMTF)
- Storage Networking Industry Association (SNIA)

The Data ONTAP Storage Management Initiative Specification (SMI-S) Agent is a command-based interface that detects and manages platforms that run NetApp Data ONTAP. The SMI-S Agent uses web-based enterprise management protocols, which allow you to manage, monitor, and report on storage elements.

The Data ONTAP SMI-S Agent 5.1 can be installed on both Windows[®] and Linux[®] platforms. This SMI-S integration is designed to allow end-to-end discovery of logical and physical objects and the associations between them, add capacity to hosts and clusters, and rapidly provision VMs by using the SAN and SMB 3.0 protocol. The SMI-S Agent interface can also be used to accomplish simple tasks by using System Center Virtual Machine Manager (SCVMM) to create and deploy new storage to individual hosts or clusters. Compliance with SMI-S standards is defined by the Conformance Test Program and set by SNIA.

Note: The Data ONTAP SMI-S Agent 5.1 complies with SMI-S 1.5 and 1.6 specifications.

2 Target Audience

This document is highly technical and is intended for storage and server administrators, as well as other information technology professionals who are interested in learning how to configure the NetApp SMI-S Provider 5.1 for Microsoft SCVMM 2012 R2.

This document assumes that the reader has read about, has formal training in, or has advanced working knowledge of Windows administration and SCVMM, as well as an understanding of NetApp storage concepts. The recommendations in this document are guidelines to assist with configuration and use cases for NetApp SMI-S 5.1. NetApp recommends that you refer to the following documentation before using the information in this technical report:

- [Data ONTAP SMI-S Agent 5.1 Installation and Administration Guide](#)
- [Data ONTAP SMI-S Agent 5.1 Release Notes](#)

Before using the information in this technical report, NetApp highly recommends reviewing the following documentation:

- [Microsoft System Center Technical Documentation Library](#)
- [Microsoft SCVMM 2012 Technical Documentation Library](#)

3 Features of SMI-S Agent 5.1

- Complies with the SMI-S 1.5 and SMI-S 1.6 specifications set by SNIA
- Manages and monitors NetApp storage systems:
 - Supports Data ONTAP 7.3.5 and later for 7-Mode systems
 - Supports clustered Data ONTAP 8.2.1
- Supports provisioning of SAN and NAS environments for NetApp storage systems by using Microsoft SCVMM 2012 R2
- Supports Windows Server[®] 2012 R2
- Supports NetApp Copy Offload (ODX; also called Fast File Copy) provisioning from SCVMM 2012 R2:

- Copy offload is a mechanism to perform full-file or subfile copies between two directories residing on remote servers, where the server can be the same or different. The copy is created by copying data between the servers (or the same server if both source and destination files are on same server) without the client reading the data from the source and writing to the destination. This reduces the client/server processor/memory utilization and minimizes network I/O bandwidth.
- With Windows Server 2012, Microsoft introduced a copy offload mechanism that enables you to offload the activity of copying files between two servers to the storage system. Data ONTAP SMI-S 5.1 supports ODX with System Center 2012 R2 and clustered Data ONTAP 8.2.
- Supports lifecycle indications that monitor SMI-S operations:
 - Win2012 R2 client registers for lifecycle indications to monitor create/delete/modify on objects such as volume, storage system, LUN, disk, igroup, initiators, and lun-map.
- Supports ASUP™ reporting:
 - This feature allows sending ASUP data for the SMI-S host—how many storage systems are managed by the SMI-S Agent, and so on.
- Supports virtual Fibre Channel adapters
- Supports IPv6:
 - SMI-S 5.1 supports IPv6 communication between the storage system, the SMI-S Agent, and SCVMM. Basically, you can add a system's IPv6 address to the SMI-S Agent and manage the SMI-S Agent with SCVMM by using its IPv6 address.

4 NetApp SMI-S Agent Architecture

The Data ONTAP SMI-S Agent 5.1 includes three components that allow administrators to manage and monitor NetApp FAS storage systems:

- Common Information Model Object Manager (CIMOM)
- Provider objects
- Repository

CIMOM is the foundation for the Data ONTAP SMI-S Agent. CIMOM collects, validates, and authenticates each application request and then responds to the application. It becomes a conduit for each request by invoking the appropriate command to handle each request. Applications that interact with the SMI-S Agent are SCVMM and the Windows Storage Management Service feature in Windows Server 2012. These applications register with the SMI-S Agent to perform storage management tasks on NetApp FAS storage systems. When an application issues a command or query to the SMI-S Agent, CIMOM loads a shared library object, invokes it to handle a request, and returns the resulting information to the application. CIMOM uses a flat-file database for its repository. It stores persistent data required at the CIM level. The Data ONTAP SMI-S Agent uses CIM-XML encoding over HTTP and Service Location Protocol (SLP).

Figure 1) Data ONTAP SMI-S Agent 5.1 interaction with NetApp storage systems.

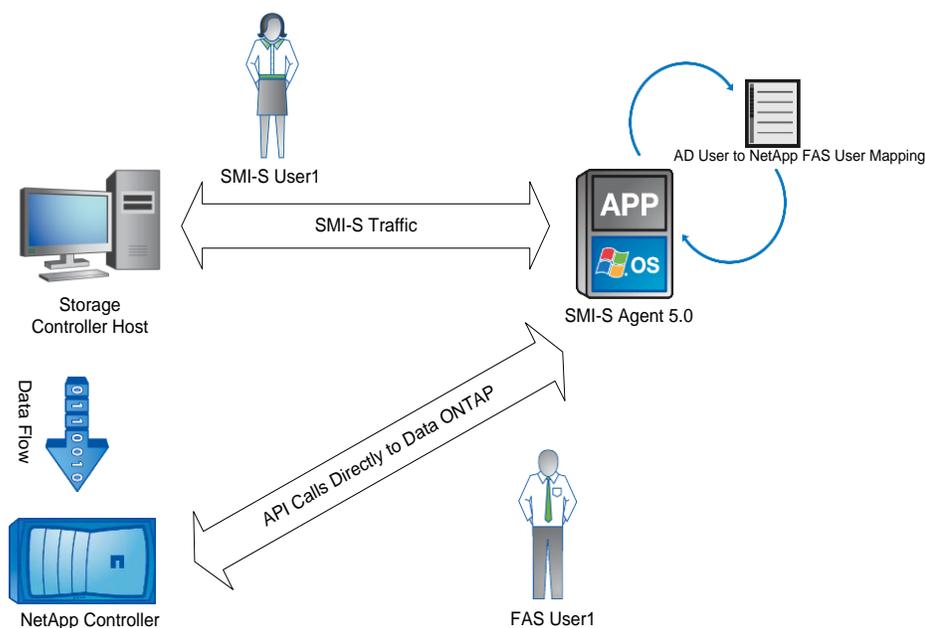


Figure 1 shows how the Data ONTAP SMI-S Agent interacts with the NetApp storage when the Data ONTAP SMI-S Agent receives a query or command from a storage management application or storage consumer host:

- The SMI-S Agent stores the user name and credentials for the NetApp storage systems.
- The SMI-S Agent keeps a record of the storage with which the SMI-S user (Windows account) is allowed to communicate.
- The data flow using NFS, CIFS, iSCSI, Fibre Channel (FC), or Fibre Channel over Ethernet (FCoE) has nothing to do with the SMI-S communication. Only management traffic, not data, is sent through the SMI-S communication path.

5 Setup and Configuration

This section assumes that your environment has been set up according to best practices. Refer to the following best practice guides when setting up your environment:

- [TR-3702: NetApp Storage Best Practices for Microsoft Virtualization and NetApp SnapManager for Hyper-V](#)
- [TR-4172: Microsoft Hyper-V over SMB 3.0 with Clustered Data ONTAP: Best Practices](#)

Prerequisites for SMI-S installation:

- An active NetApp Support account
- AD/DNS infrastructure with administrator credentials
- Appropriate licenses for the protocol (iSCSI, FCP, or CIFS) that will be used on the NetApp target
- NetApp FlexClone[®] license for creation of LUN clones
- SCVMM 2012 Server already installed and functional
- SCVMM 2012 Administration console already installed and functional
- Hyper-V hosts installed and working properly
- iSCSI Initiator service enabled and starts automatically on each Hyper-V host

- MPIO feature installed on each Hyper-V host

Note: Installing the SMI-S Agent on the server that is installed with the SCVMM is not supported.

The SMI-S Agent can easily be run within another virtual machine, because only IP connectivity to the SCVMM/SCOM server and NetApp storage controllers is needed.

The SCVMM 2012 server must be installed on a separate physical or virtual server than the SMI-S server, and both servers must be members of the same Active Directory® domain.

Table 1 describes the installation requirements to run NetApp SMI-S 5.1 on Windows platforms.

Table 1) SMI-S 5.1 installation requirements.

Category	Requirements
Hardware requirements	<ul style="list-style-type: none"> • Microsoft System Center Virtual Machine Manager 2012 SP1/R2 (SCVMM) • To determine the hardware requirements, go to http://technet.microsoft.com/en-us/library/hh546785.aspx.
Data ONTAP requirements	<ul style="list-style-type: none"> • Supports Data ONTAP 7.3.5 and later for 7-Mode systems • Supports clustered Data ONTAP 8.2 and 8.2.1
Software requirements	<ul style="list-style-type: none"> • Windows PowerShell® V2 or later, .NET 3.5 or later • Microsoft System Center Virtual Machine Manager 2012 SP1 R2 (SCVMM) <p>(For information, refer to the Microsoft TechNet website.)</p>

Windows Failover Clusters

If you follow the guidance in [TR-3702: NetApp Storage Best Practices for Microsoft Virtualization and NetApp SnapManager for Hyper-V](#), your Windows failover cluster should be able to pass the Microsoft Windows failover cluster validation process.

Note: Do not continue with this report unless your Windows failover cluster environment is healthy and operational. This includes support for quorum disks and for Cluster Shared Volumes (CSVs) being enabled.

SMB 3.0 Environments

- Follow the guidelines in [TR-4172: Microsoft Hyper-V over SMB 3.0 with Clustered Data ONTAP: Best Practices](#) before proceeding to manage Hyper-V over SMB 3.0 environments using SMI-S.
- For information about how to install the NetApp SMI-S Agent 5.1, refer to the [Data ONTAP SMI-S Agent 5.1 Installation and Configuration Guide](#).

5.1 Populating the SMI-S Agent with NetApp Targets

The commands in Table 2 can be used to populate the SMI-S Agent with NetApp targets.

Table 2) Command parameters.

Variable Name	Variable Usage
%user1% & %password1%	Local administrator account name and password
%password1%	Password for %user1%
%array%	IP address or resolvable FQDN to a NetApp array
%user2% & %password2%	Account that is authorized on the NetApp array

The following commands are used to open the communication path between the storage controller and the SMI-S Agent.

To run these command from the command window, click the Start menu, select the Data ONTAP SMI-S Agent folder, and then select Data ONTAP SMI-S Agent. The local Data ONTAP account needs to be assigned a customized role; it contains the following permissions.

1. To use an account other than the one used to install the agent, use the following command to add that user to the SMI-S Agent:

```
CimUser -a -u %user1% -w %password1%
```

2. Upon success, you receive confirmation of the method used to connect, such as a protocol or a port.
3. The success message looks similar to the following:

```
Returned Path ONTAP_FilerData.hostname"10.58.2.3",port=80
```

A failure message looks similar to the following:

```
CIM_ERR_FAILED: Cant connect to host (err=10060). -With storage 10.58.2.3
```

4. After you have connected to the array, you can verify both the HTTP and HTTPS by using the following command to retrieve data:

```
SMIS %user1% %password1% disks -t https
```

This command returns the SMI-S data for disks that are attached to the controllers.

Note: Use HTTPS for communication purposes.

5.2 Firewall Considerations

If the Windows firewall is enabled on the SMI-S server, then create firewall exceptions to allow the following TCP and UDP ports inbound:

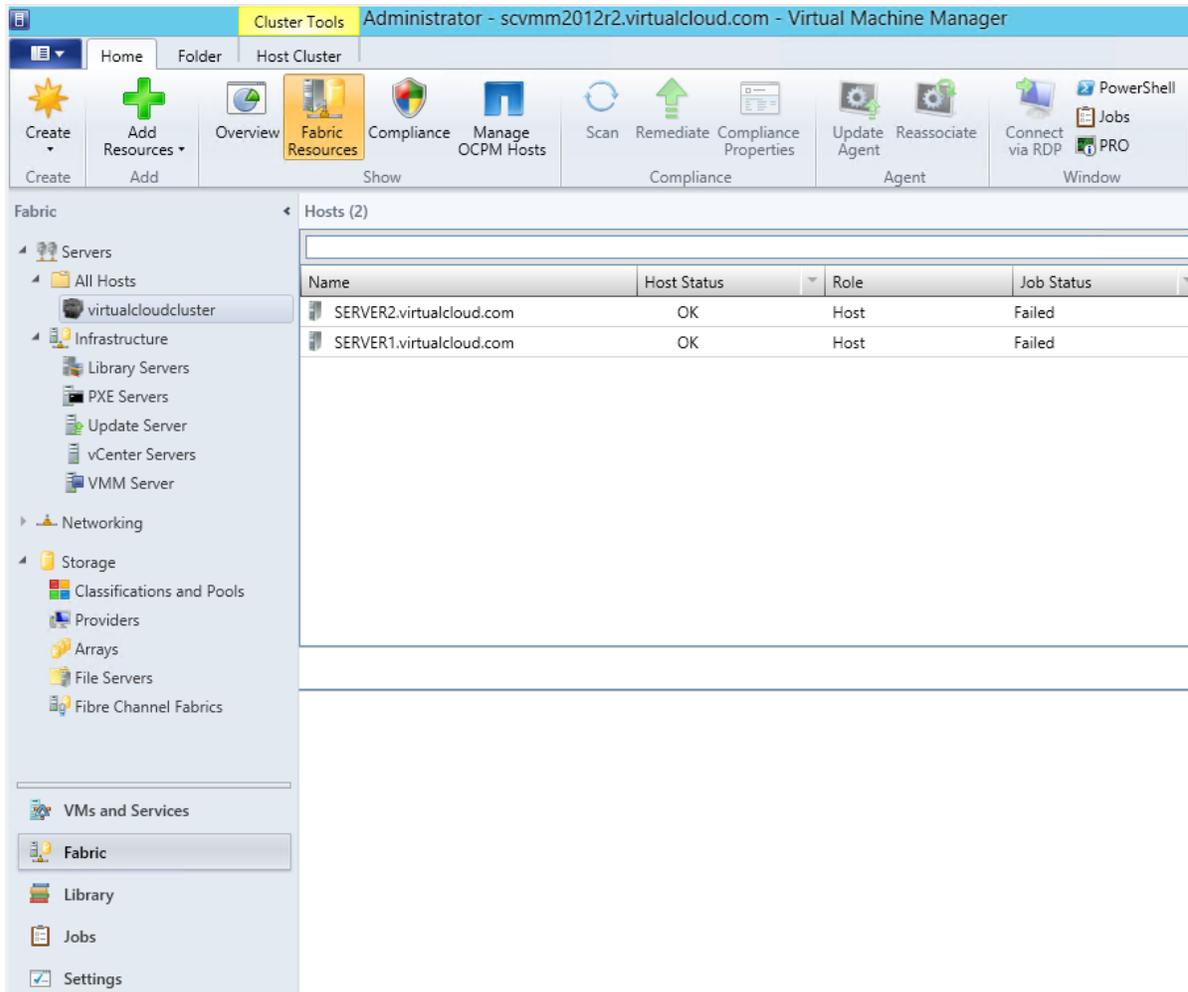
- Data ONTAP SMI-S Agent CIMOM HTTP rule TCP: 5988 inbound (allows SCVMM 2012 to communicate with SMI-S on the SMI-S server through http).
- Data ONTAP SMI-S Agent CIMOM HTTPS rule TCP: 5989 inbound (allows SCVMM 2012 to communicate with SMI-S on the SMI-S server through https).
- Data ONTAP SMI-S Agent SLP rule UDP: 427 inbound (Service Location Protocol (SLP) is used for SMI-S multicast and broadcast discovery).

6 Configuring SCVMM 2012 R2 to Use the NetApp SMI-S Provider

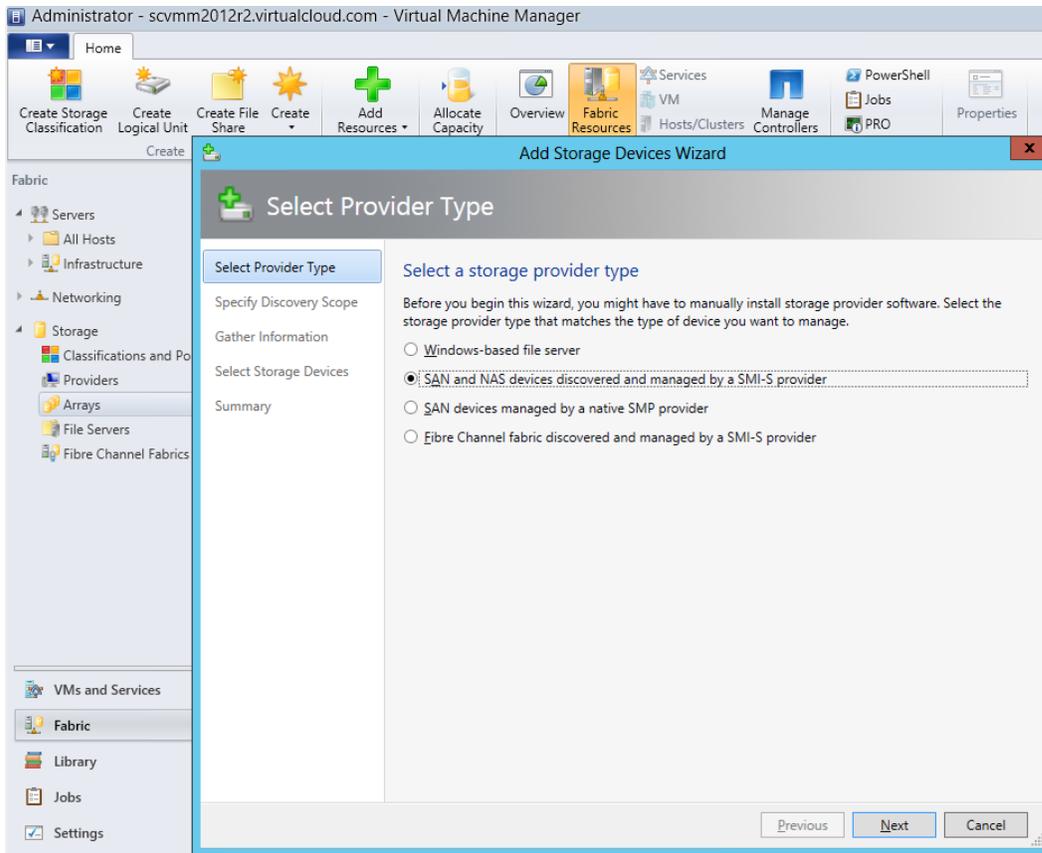
6.1 Adding a Storage Device Using SMI-S to the SCVMM 2012 R2 Console

The NetApp SMI-S server and the SCVMM 2012 server must be members of the same domain but reside on separate physical or virtual servers.

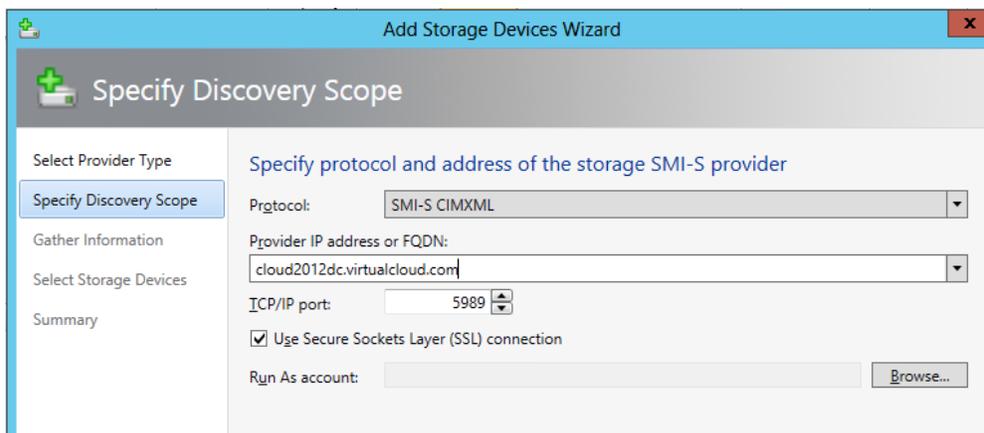
1. On the server hosting **SCVMM 2012**, open the **SCVMM 2012 Administrator** console. On the **Home** tab, select the **Fabric Resources** workspace.



- Expand the **Storage** node, right-click **Arrays**, and select **Add Storage Devices**. Select the storage provider type **SAN and NAS devices discovered and managed by a SMI-S provider** and then click **Next**.

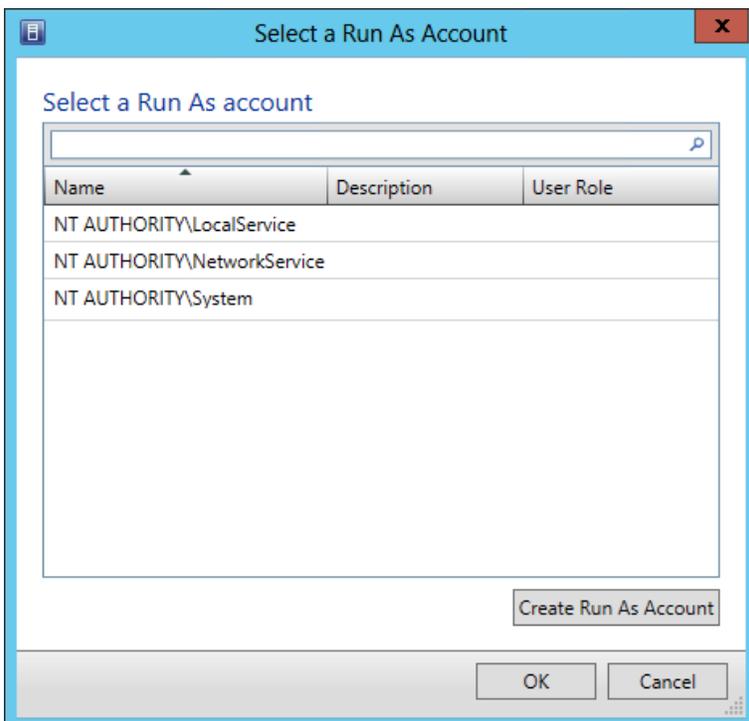
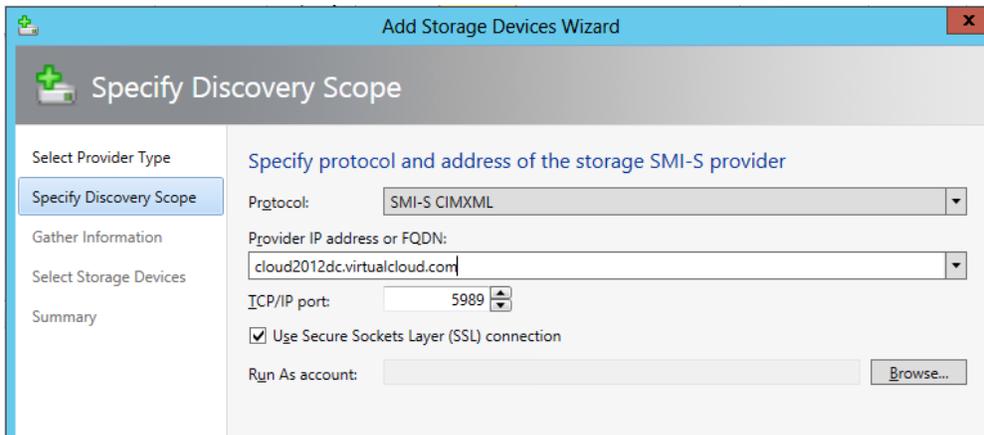


3. On the **Add Storage Devices Wizard** page, enter the IP address or fully qualified domain name (FQDN) of the NetApp SMI-S server, along with the correct port number.
4. For http, clear the **Use Secure Sockets Layer (SSL) connection** checkbox and specify the correct port (5988 is the default). For https, select the **Use Secure Sockets Layer (SSL) connection** checkbox and specify the correct port (5989 is the default).



6.2 Creating an SMI-S Run As Account

1. Click **Browse** to the right of the **Run As account** field and then click **Create Run As Account**.



2. Enter the account name (and an optional description, if desired) for the **Run As account**. Enter the user name and password and then click **OK** to return to the previous screen.

Note: The user name and password provided should be the same credentials as the SMI-S local user account on the NetApp SMI-S server.

Provide the details for this Run As account

Name: SMIS-Administrator

Description: Same credentials as the SMI-S local user account on the NetApp SMI-S server.

User name: administrator
Example: contoso/domainuser or localuser

Password:

Confirm password:

Validate domain credentials

View Script OK Cancel

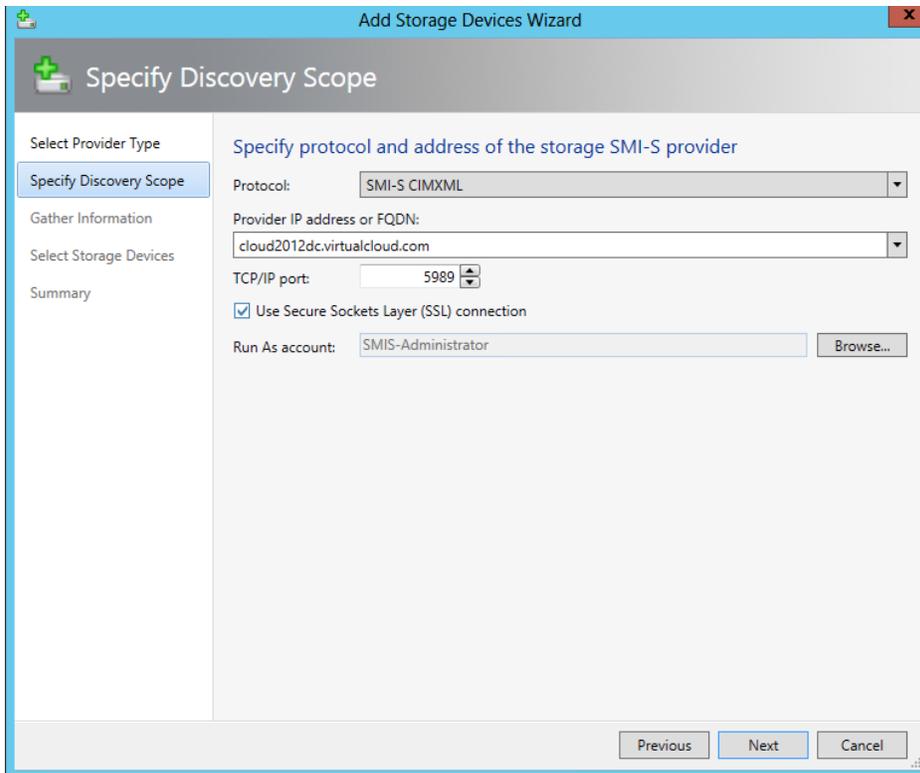
3. Click the newly created **Run As account** and then click **OK**.

Select a Run As account

Name	Description	User Role
NT AUTHORITY\LocalService		
NT AUTHORITY\NetworkService		
NT AUTHORITY\System		
SMIS-Administrator		Administrator
virtualcloud\administrator		Administrator

Create Run As Account OK Cancel

4. Verify that the **Run As account** and the **IP Address** (or FQDN) are listed and then click **Next**.



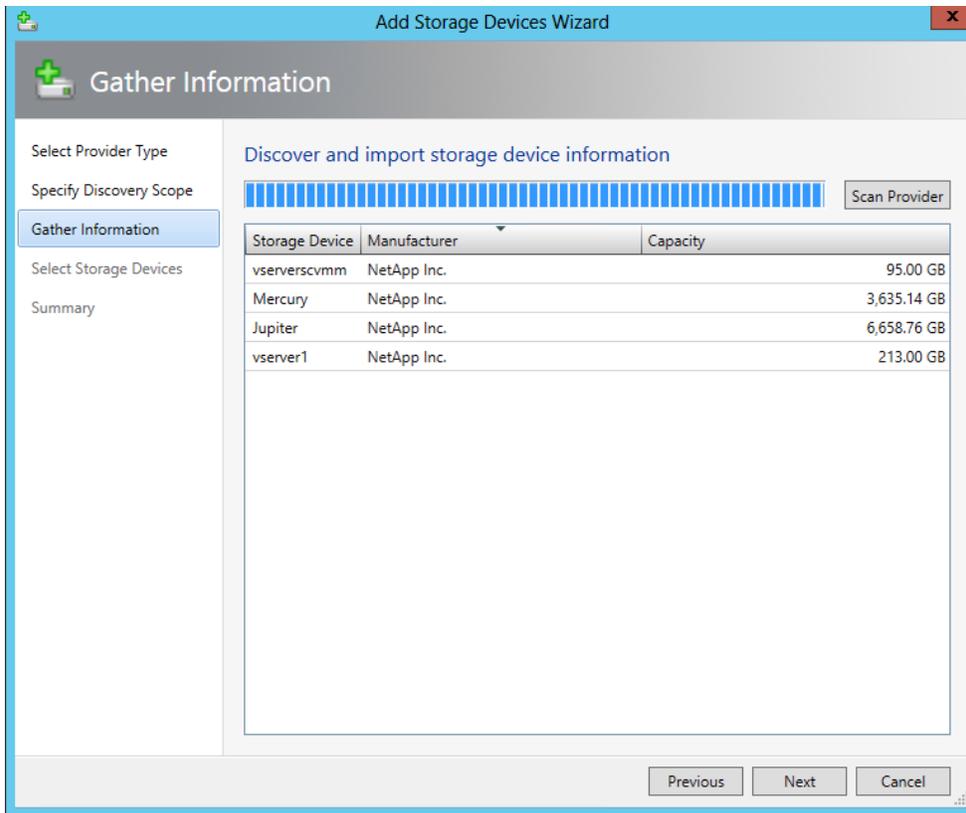
6.3 Discovering and Importing Storage Device Information and Assigning Classification

As shown in the following screenshot, SCVMM 2012 displays a progress bar as it begins to import the storage device information. The import process may require several minutes to complete.

During the discovery, you may receive a warning regarding the certificate. Click **Import** to allow the connection. (For details, go to <http://technet.microsoft.com/en-us/library/gg610563.aspx>.)

For managing storage virtual machines (SVMs) in SMI-S, it is mandatory to have at least one data LIF with the firewall policy set to Management (to allow management traffic). It is also mandatory to add a cimuser (preferably a local user) to SMI-S Agent by using the `cimuser` command.

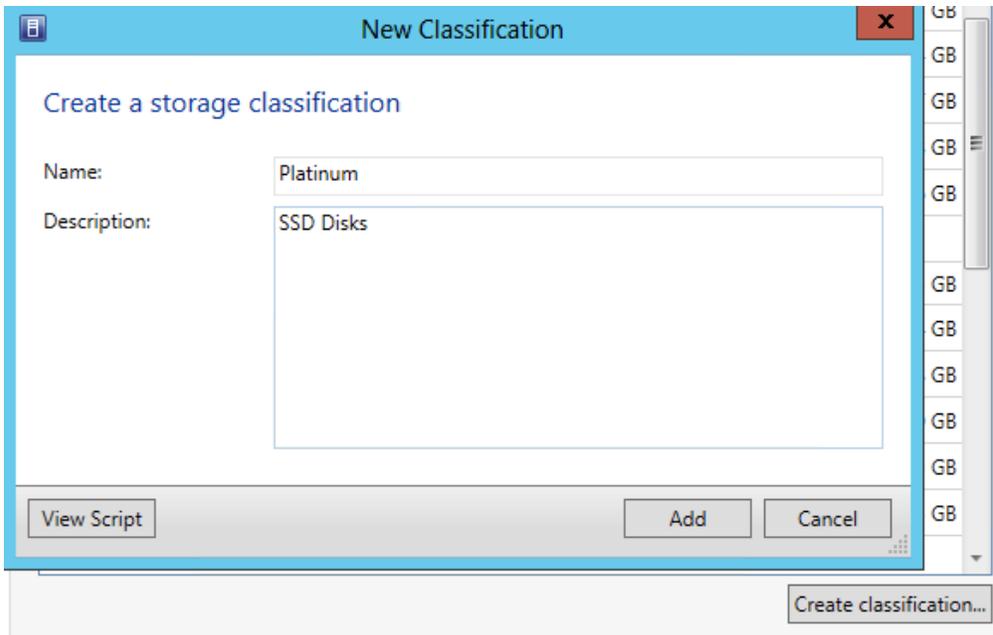
When the import process is complete, the NetApp storage arrays are displayed, as shown in the following screenshot. In this example, two SVMs and two 7-Mode controllers have been discovered and imported. Click **Next**.



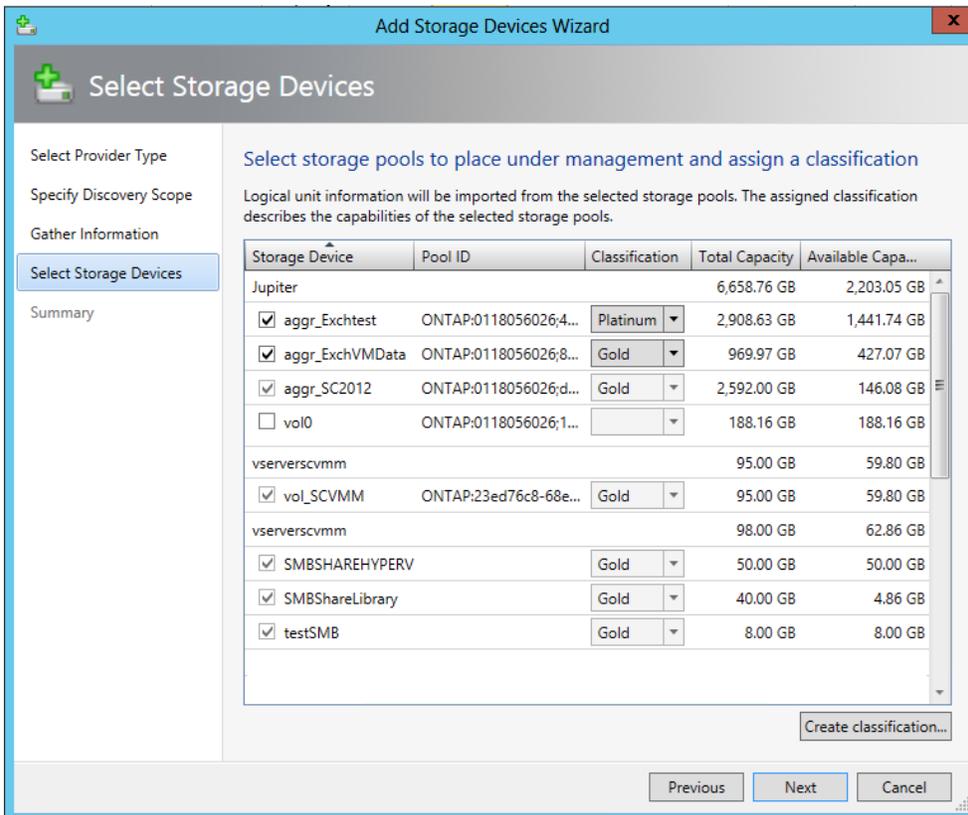
Storage pools can be classified by a number of methods. The most commonly used method is to deploy classifications based on the drive type and RPM, such as the following:

- **Bronze.** 7200 SATA
- **Silver.** 10K RPM SAS 2.5"
- **Gold.** 15K RPM SAS 3.5"
- **Platinum.** SSD

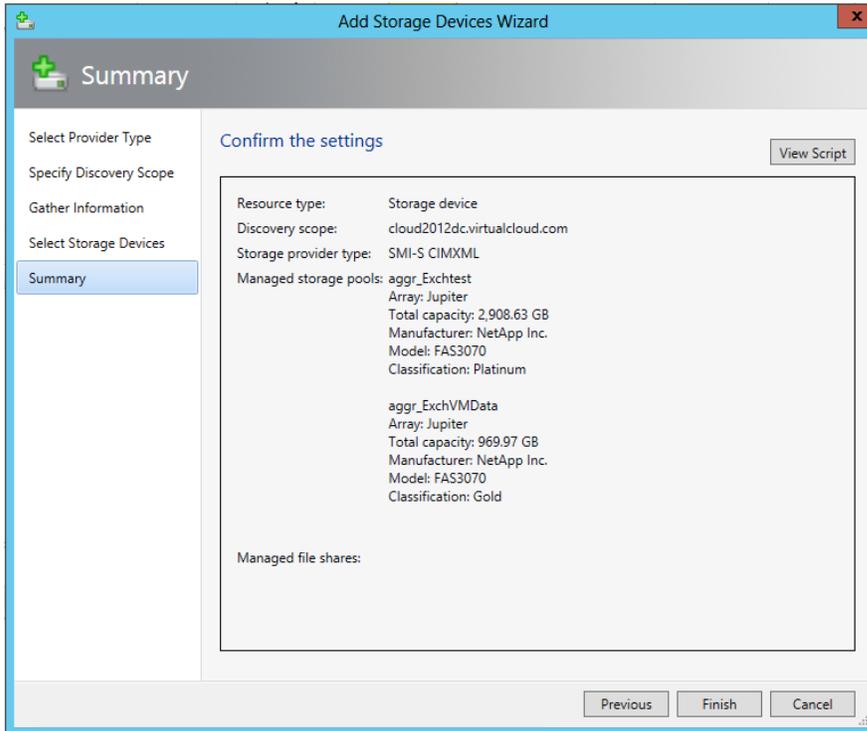
Although these classification pools are commonly adopted, other methods to differentiate aggregates also exist. Other methods might include the class of controller to which the storage is connected, because a midrange controller might not be capable of driving the load as efficiently as a high-end controller. Another possible classification type could be the size of the underlying aggregates; a 54-drive aggregate would have different performance and capacity considerations than a 10-drive set. Classification pools could also be defined strictly along financial boundaries, either by the cost of the underlying storage or by storage asset owner. On the next screen, click **Create classification** to define one or more classifications for your imported NetApp storage arrays.



A *classification* describes the capabilities of the selected storage pool. After you have entered a name and description the storage classification, click **Add**, as shown in the preceding screenshot. Repeat the preceding steps to create additional storage classifications. In this example, four classifications were created: Gold, Silver, Bronze, and Platinum. Consider creating a special pool for monitoring the aggregates to which you do not plan to deploy. An example is to create a pool for aggr0, which is commonly reserved for administrative use.



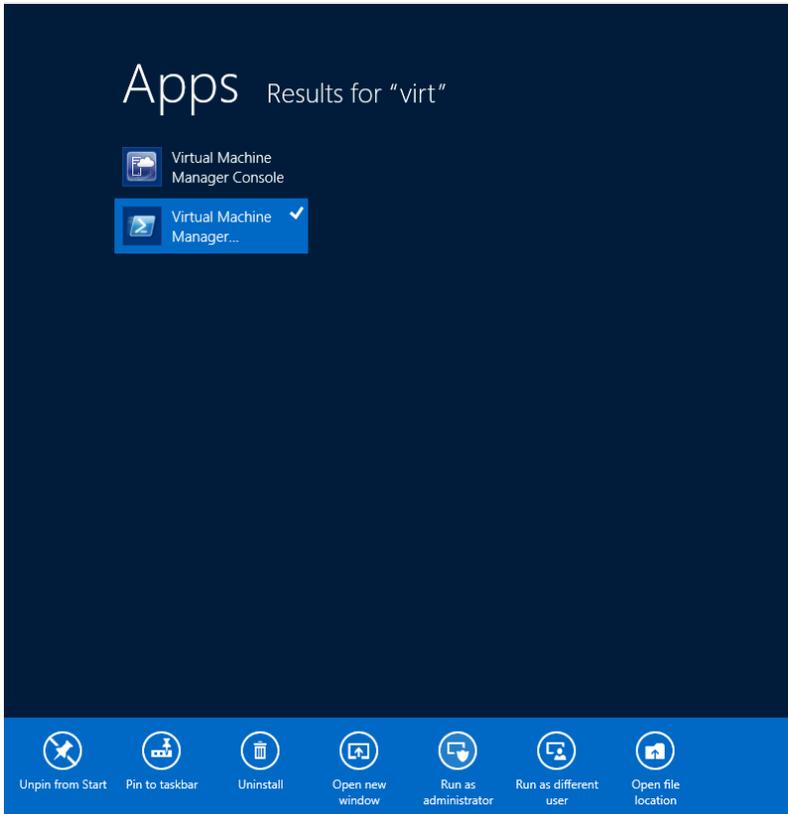
1. When you have created the classifications, click **Next**.
2. Confirm the settings and then click **Finish** to complete the wizard.



If a storage center has a large number of volumes, discovery requires additional time, 30 minutes or more per storage center.

6.4 Using Virtual Machine Manager PowerShell Cmdlets to Add NetApp SMI-S Provider to SCVMM

1. Open the **Virtual Machine Manager Command Shell** in **Run as administrator** mode.



6.5 Adding NetApp SMI-S Provider by Using the HTTP Protocol

1. In the **Virtual Manager Command Shell**, enter the following set of commands:

```
# Get the SMIS Run As Account.
$RunAsAcct = Get-SCRunAsAccount -Name *smis*

# Add the SMI-S Storage Provider to SCVMM console.
Add-SCStorageProvider -NetworkDeviceName ` "http://cloud2012dc.virtualcloud.com" -TCPPort 5988 -
Name "cloud2012dc.virtualcloud.com" -RunAsAccount $RunAsAcct
```

```
Administrator: Virtual Machine Manager Command Shell
PS C:\> $RunAsAcct = Get-SCRunAsAccount -Name *smis*
PS C:\> Add-SCStorageProvider -NetworkDeviceName "http://cloud2012dc.virtualcloud.com" -TCPPort 5988 -Name "cloud2012dc.virtualcloud.com" -RunAsAccount $RunAsAcct
NetworkAddress      : http://cloud2012dc.virtualcloud.com
ICPPort             : 5989
ProviderType        : SmisCimXml
ProviderFlags       : StorageArray, StorageFileServer
Status              : Responding
RunAsAccount        : SMIS-Administrator
IsNonTrustedDomain  : False
StorageArrays       : (userver1, Jupiter, unknown, userservercmm...)
StorageFabrics      : ()
StorageSwitches     : ()
StorageFileServers  : (Jupiter, userservercmm, userver1)
ObjectType          : StorageProvider
Accessibility       : Public
Name                : 10.238.188.15
IsViewOnly          : False
Description         :
AddedTime           : 12/19/2013 9:22:11 PM
ModifiedTime        : 1/8/2014 2:09:37 AM
Enabled             : True
MostRecentTask      :
ServerConnection    : Microsoft.SystemCenter.VirtualMachineManager.Remoting.ServerConnection
ID                  : 8d913a93-feaa-4c05-a0e2-07a9d07e7849
MarkedForDeletion   : False
IsPullyCached       : False
MostRecentTaskIfLocal :
```

After commands have been executed, the Storage Provider is available in SCVMM, in **Fabric > Storage > Providers**.

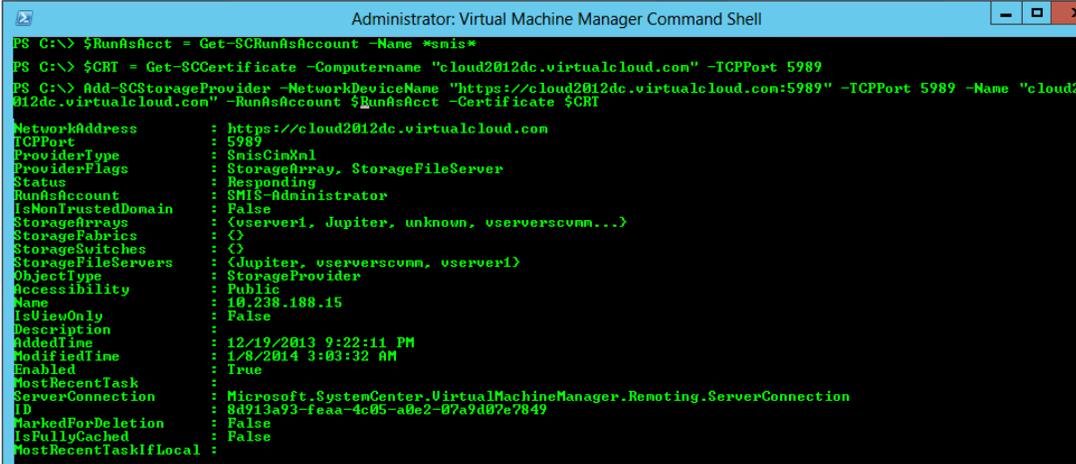
6.6 Adding NetApp SMI-S Provider by Using HTTPS Protocol with SSL Connection

2. Enter the following set of commands:

```
# Get the SMIS Run As Account.
$RunAsAcct = Get-SCRunAsAccount -Name *smis*

# Get the Certificate Details.
$CRT = Get-SCCertificate -Computername "cloud2012dc.virtualcloud.com" -TCPPort 5989

# Add the SMI-S Storage Provider to SCVMM console.
Add-SCStorageProvider -NetworkDeviceName ` "https://cloud2012dc.virtualcloud.com" -TCPPort 5989 -
Name "cloud2012dc.virtualcloud.com" -RunAsAccount $RunAsAcct
```



```
Administrator: Virtual Machine Manager Command Shell
PS C:\> $RunAsAcct = Get-SCRunAsAccount -Name *smis*
PS C:\> $CRT = Get-SCCertificate -Computername "cloud2012dc.virtualcloud.com" -TCPPort 5989
PS C:\> Add-SCStorageProvider -NetworkDeviceName "https://cloud2012dc.virtualcloud.com:5989" -TCPPort 5989 -Name "cloud2012dc.virtualcloud.com" -RunAsAccount $RunAsAcct -Certificate $CRT

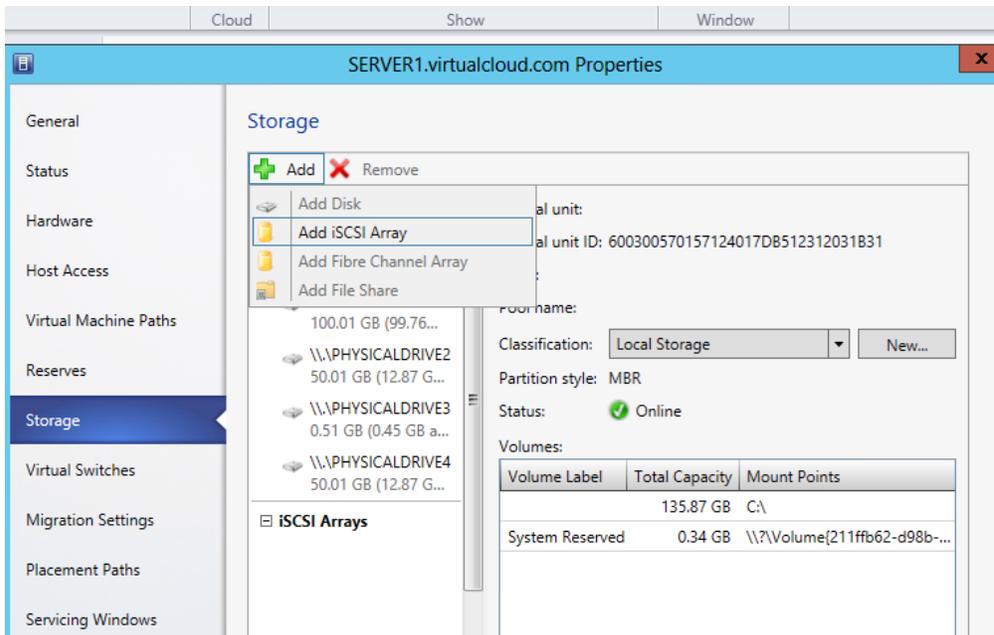
NetworkAddress      : https://cloud2012dc.virtualcloud.com
TCPPort             : 5989
ProviderType        : SmisCinKml
ProviderFlags       : StorageArray, StorageFileServer
Status              : Responding
RunAsAccount        : SMIS-Administrator
IsNonTrustedDomain : False
StorageArrays       : (userver1, Jupiter, unknown, vserverscvm...)
StorageFabrics      : {}
StorageSwitches     : {}
StorageFileServers  : (Jupiter, vserverscvm, vserver1)
ObjectType          : StorageProvider
Accessibility       : Public
Name                : 10.238.188.15
IsViewOnly          : False
Description         :
AddedTime           : 12/19/2013 9:22:11 PM
ModifiedTime        : 1/8/2014 3:03:32 AM
Enabled             : True
MostRecentTask      :
ServerConnection    : Microsoft.SystemCenter.VirtualMachineManager.Remoting.ServerConnection
ID                  : 8d913a93-feaa-4c85-a0e2-07a9d07e7849
MarkedForDeletion   : False
IsFullyCached       : False
MostRecentTaskIfLocal :
```

7 Use NetApp SMI-S Provider for Hyper-V Hosts Storage Management by Using SCVMM 2012 R2

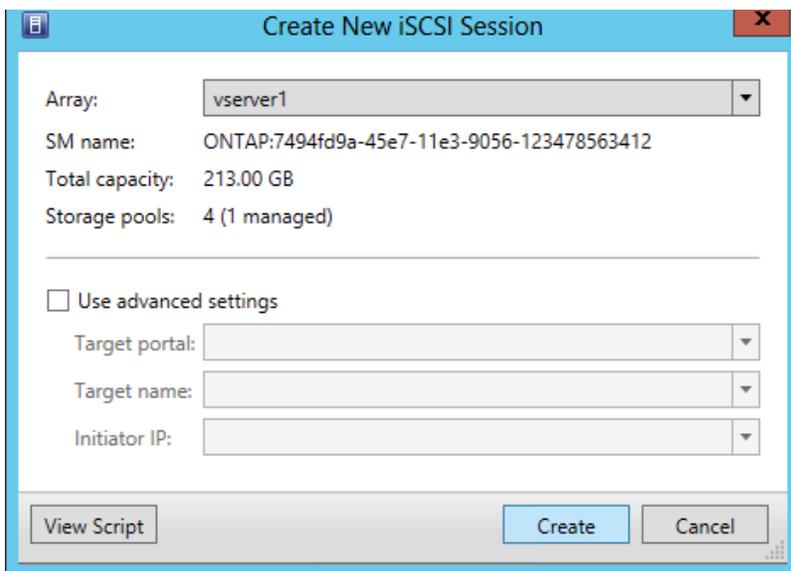
7.1 Connecting the Hyper-V Hosts to the NetApp Storage

Because the NetApp storage has been added to the SMI-S Provider, it can be directly managed from SCVMM 2012. The next step is to give access to the Hyper-V hosts to the storage array by creating an iSCSI session on each Hyper-V host.

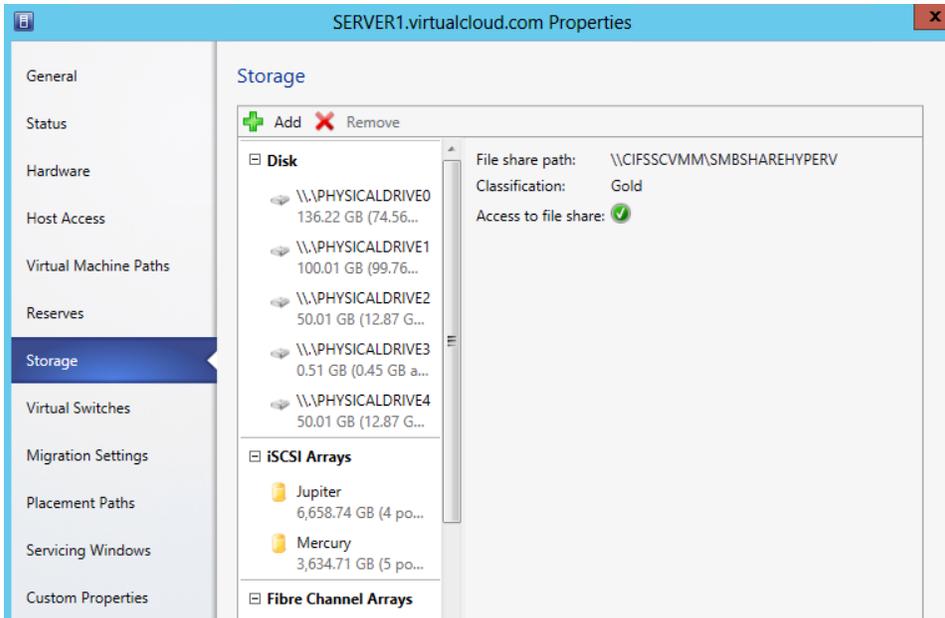
1. In the **Fabric**, open the **SCVMM** console.
2. Select **Servers > All Hosts** and then select the first Hyper-V host.
3. On the **Storage** page, right-click the host and select **Properties**. Click **Add** and then select **Add iSCSI Array**.



4. The list of storage added in the SMI-S Provider is displayed. Select the desired storage and click **Create**.



5. The iSCSI Arrays are displayed. The Hyper-V host now has access to the NAS, and the storage allocation and provisioning can be done through SCVMM.



6. Repeat this setting for each Hyper-V host.

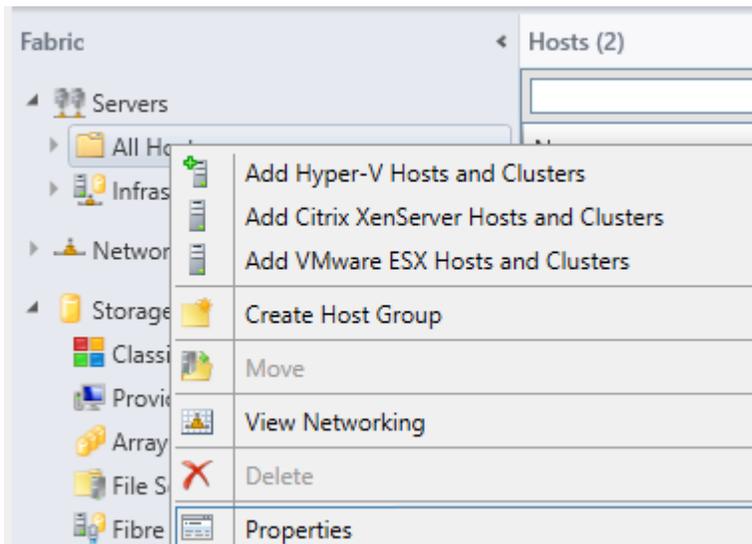
For details about creating the iSCSI session, refer to the Microsoft document [How to Configure Storage on a Hyper-V Host in VMM](#).

Allocating Storage Pools to Hyper-V Host Groups to use the storage in SCVMM, you must allocate storage pools to some of the host groups. When this procedure is performed, the Hyper-V hosts' member of that host group will be suitable for LUN provisioning and LUN creation, only for the selected storage pools.

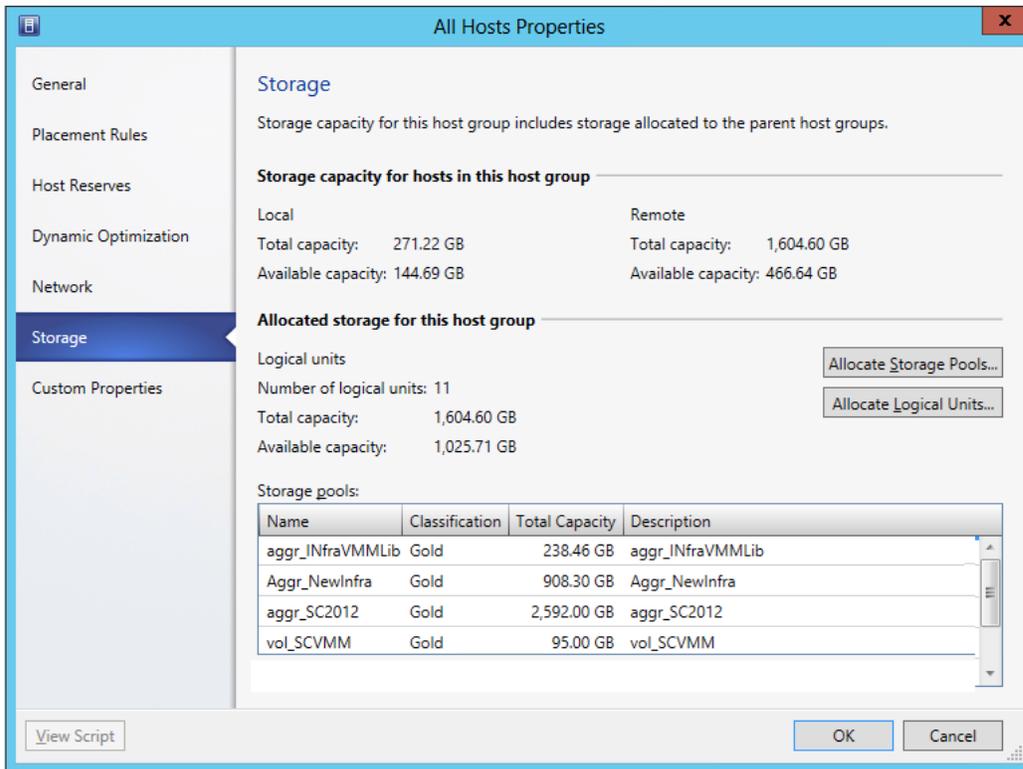
For details about how to allocate storage pools to a host group in VMM (<http://technet.microsoft.com/en-us/library/gg610635.aspx>).

7.2 Allocating Storage Pools to a Host Group in VMM

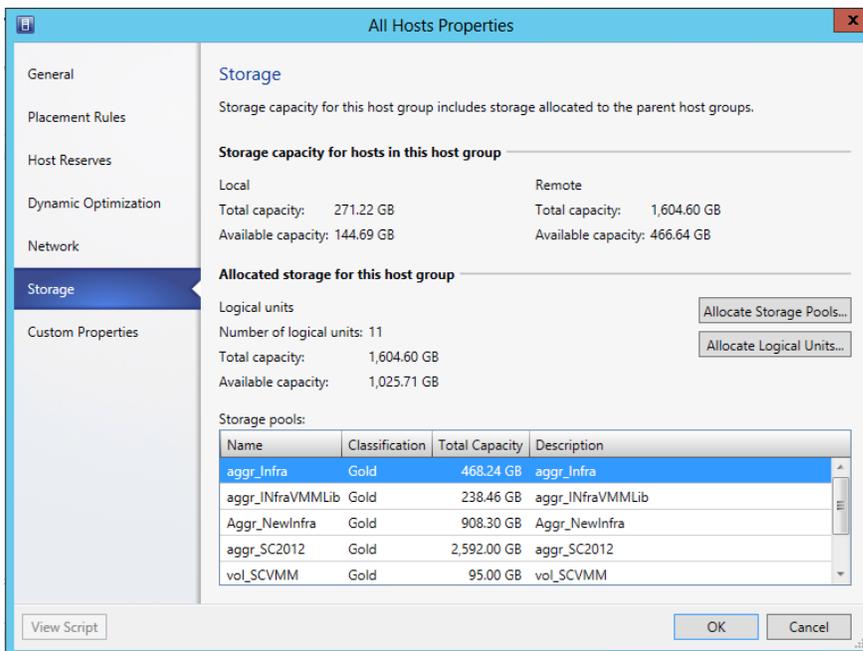
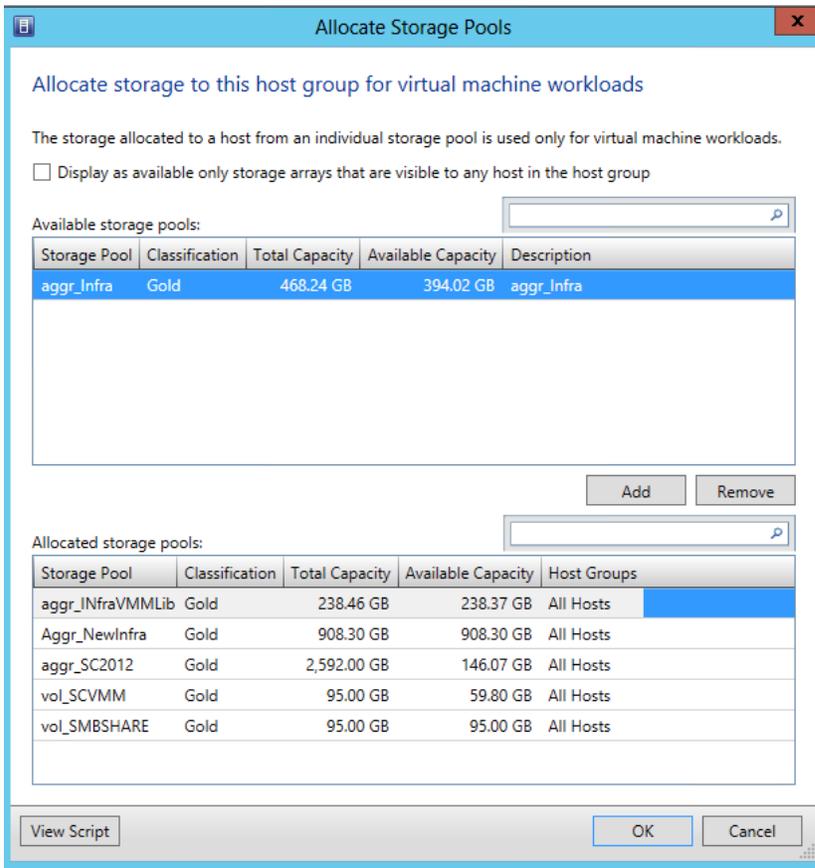
1. Under **Fabric**, select the storage host group on which you want to allocate the storage pool.
2. Right-click > **Properties**.



3. On the **Storage** page, select **Storage** and then click **Allocate Storage Pools**.



4. Select an **Available storage pool** and then click **Add**. This allocates the storage pool to the **All Hosts** host group, so that the Hyper-V hosts can use it.

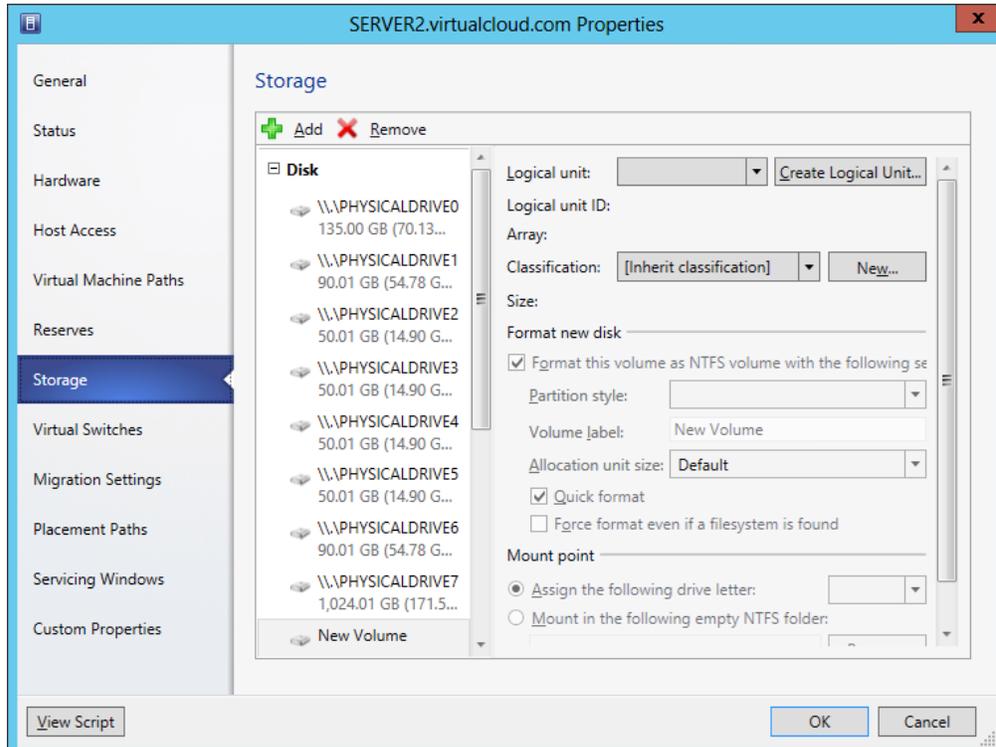


The storage pool is allocated to the host group. SCVMM can now create and allocate a LUN in this storage pool for the host member of the host group.

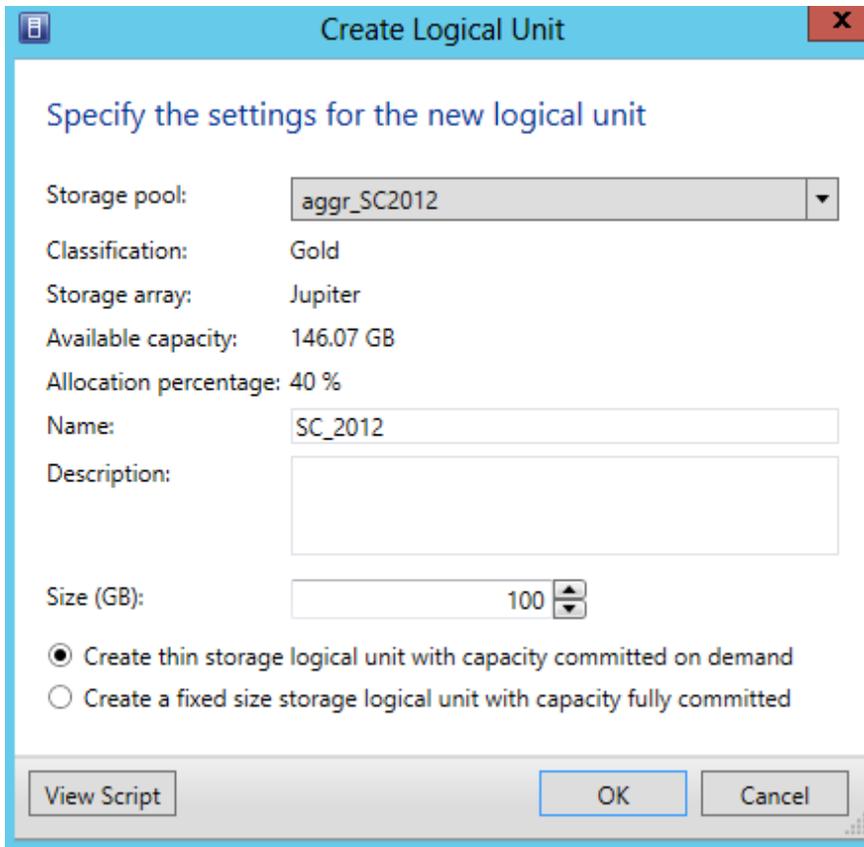
7.3 Creating a LUN for a Standalone Hyper-V Host

Before starting this procedure, make sure that at least one storage pool has been allocated to the host group.

1. On the **SCVMM 2012** console, navigate to **Fabric**; under **Servers**, select a standalone Hyper-V host.
2. Right-click the host and select **Properties**. On the **Storage** page, click **Add** and then click **Disk**.



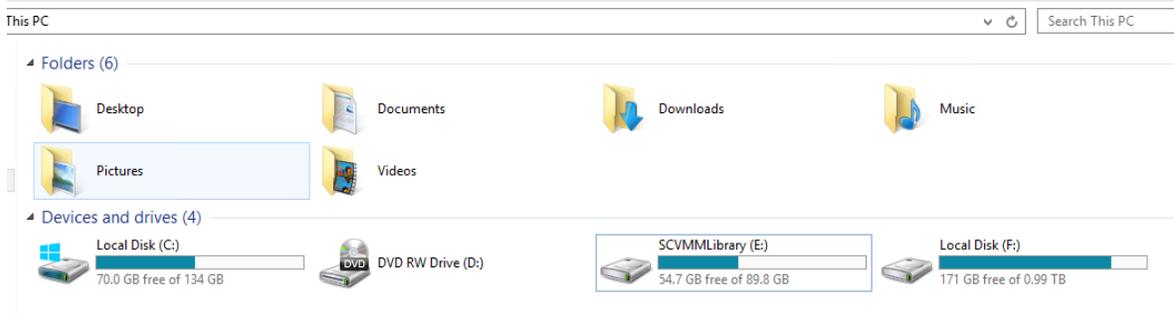
3. Click **Create Logical Unit**. The LUN creation wizard opens.
4. Select the **Storage pool** where you want to create the LUN. Only storage pools that have been allocated to the host group are visible. Enter a name for the LUN. Select the size of the LUN. Select either **Create thin storage logical unit with capacity committed on demand** or **Create a fixed size storage logical unit with capacity fully committed** and then click **OK**.
5. The LUN is created and then select the **Partition style**, **Volume label**, **format option**, and drive letter to use on the Hyper-V host (drive E in this example).



The new disk is created; the LUN can be seen in the **Fabric, Storage, Classification, and Pools**.

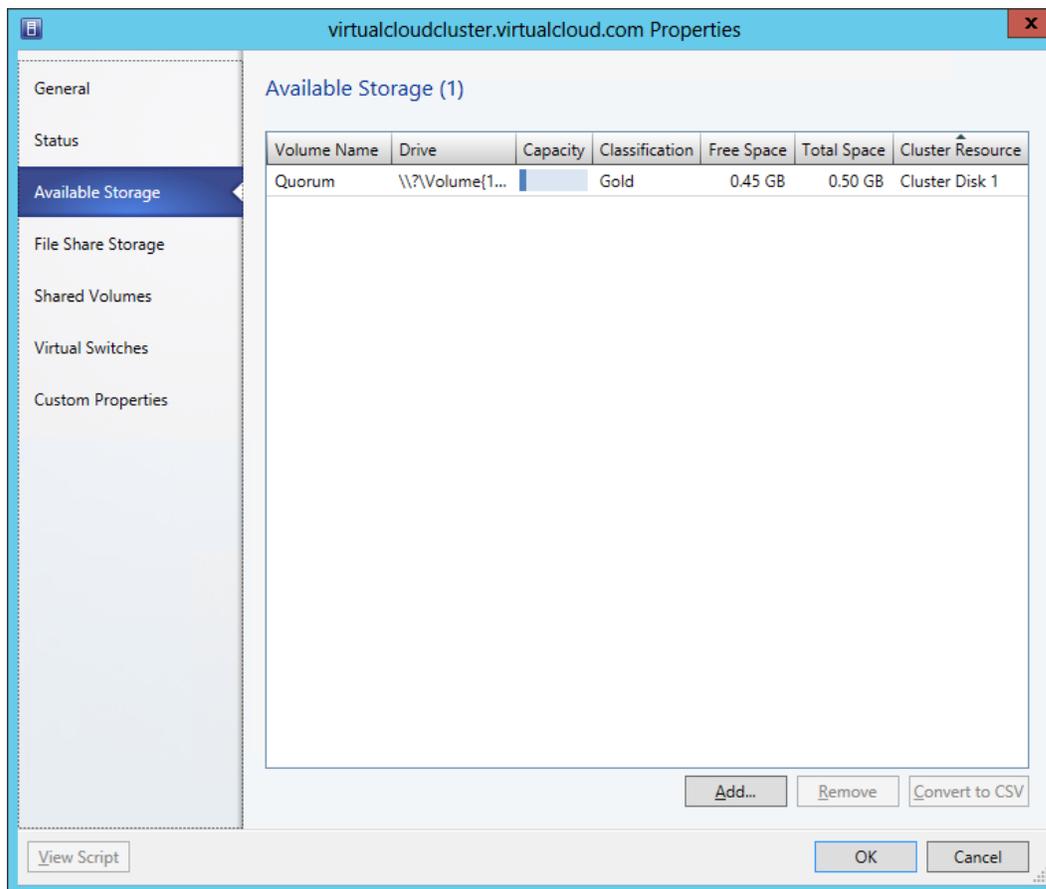
Name	SM Name	Type	Size
Platinum		Classification	0 GB
Gold		Classification	4,396.95 GB
aggr_Infra	aggr_Infra	Storage pool	468.20 GB
aggr_INfraVMMLib	aggr_INfraVMMLib	Storage pool	238.46 GB
Aggr_NewInfra	Aggr_NewInfra	Storage pool	908.30 GB
aggr_SC2012	aggr_SC2012	Storage pool	2,591.99 GB
/vol/vol_SC2012/SC_2012	/vol/vol_SC2012/SC_2012	Logical unit	1,024.01 GB
/vol/vol_SC2012/SC_2012_quorum	/vol/vol_SC2012/SC_2012_q...	Logical unit	0.51 GB

6. Log in remotely to the Hyper-V host and verify that the disk has been created and is available.

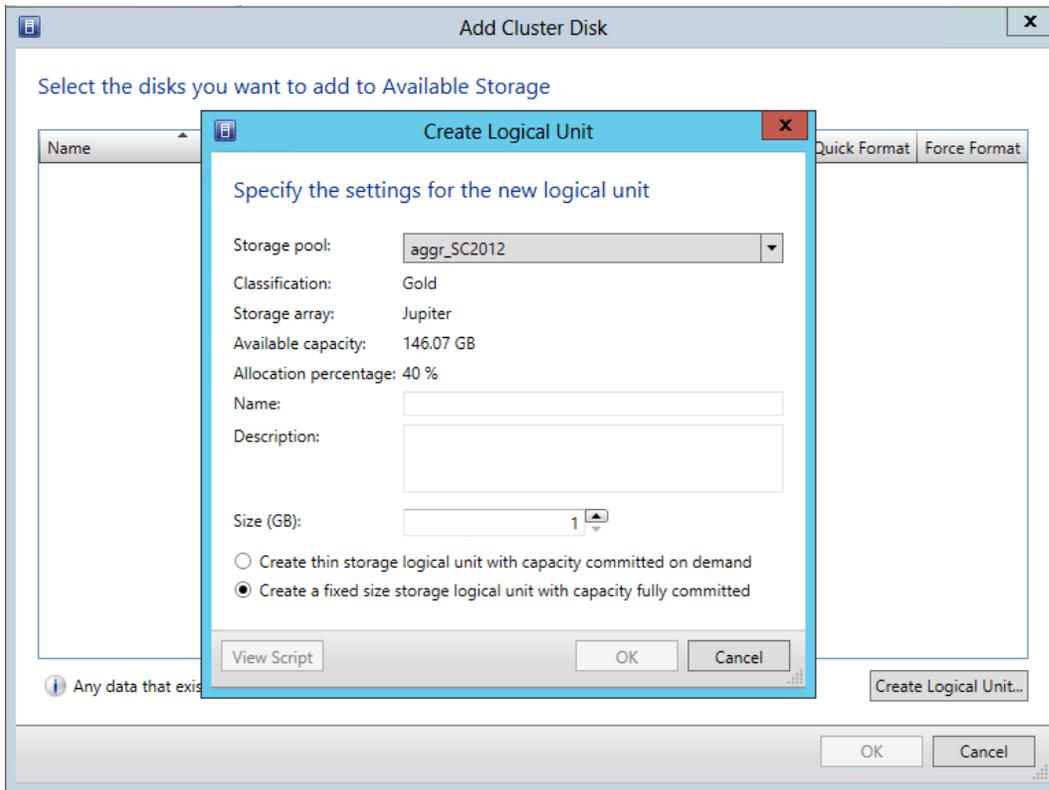


7.4 Creating a LUN for the Hyper-V Cluster

1. In the **SCVMM** console, select **Fabric > Servers** and select the cluster where you want to create a new LUN. Right-click the cluster, select **Properties**, click **Available Storage**, and then click **Add**.

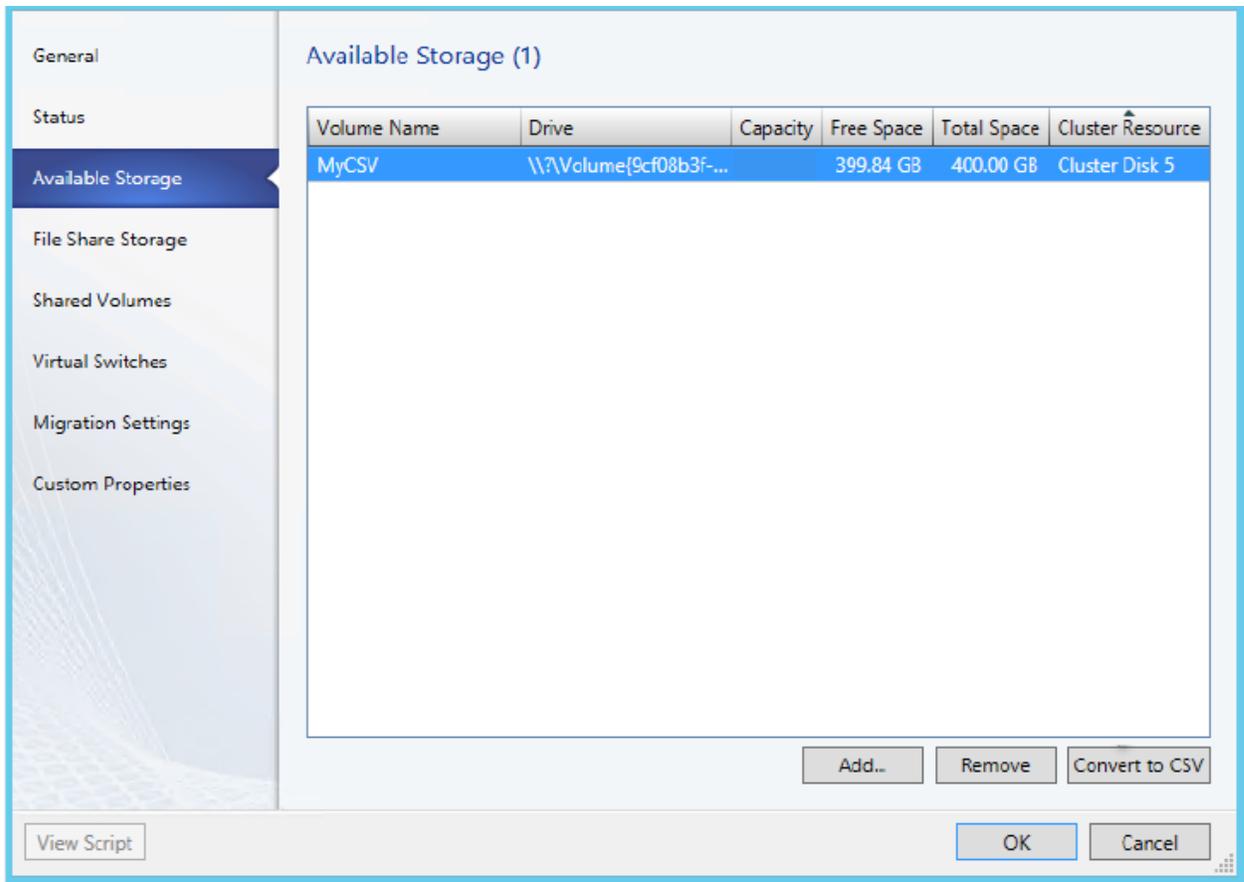


2. Click **Create Logical Unit**.
3. Select **Storage pool**, enter a name, select the size of the LUN, select either **Create thin storage logical unit with capacity committed on demand** or **Create a fixed size storage logical unit with capacity fully committed**, and then click **OK**.



When the LUN has been created for the cluster, a new volume is available under **Available Storage** in the cluster.

When the SCVMM job is complete, the Hyper-V hosts' member of the cluster has a new **Cluster Shared Volume** that can be used to store the VM. The result can be seen in the cluster **Property**, in the **Shared Storage** section.



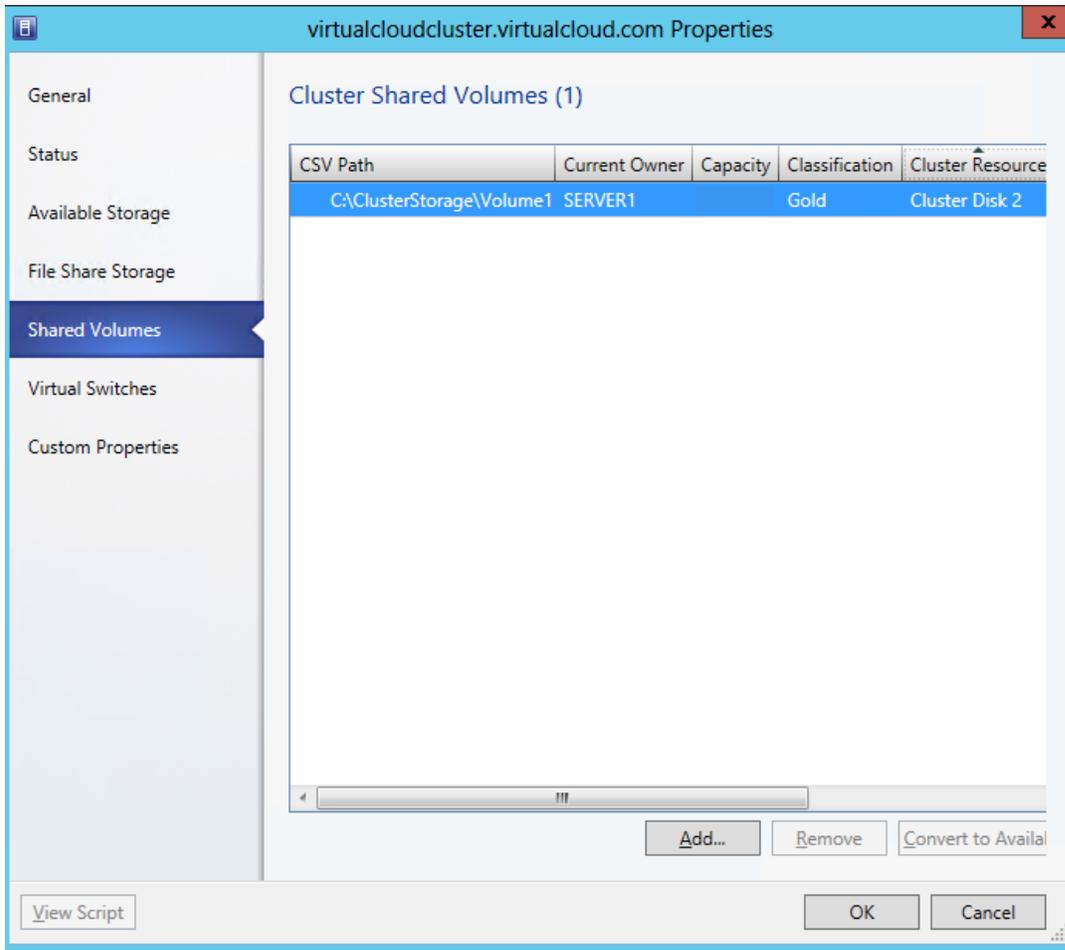
7.5 Using a Cluster Disk as a Cluster Shared Volume for High Availability

1. Select a disk and click **Convert to CSV**.

Available Storage (1)

Volume Name	Drive	Capacity	Free Space	Total Space	Cluster Resource
MyCSV	\\?\Volume{9cf08b3f-...	399.84 GB		400.00 GB	Cluster Disk 5

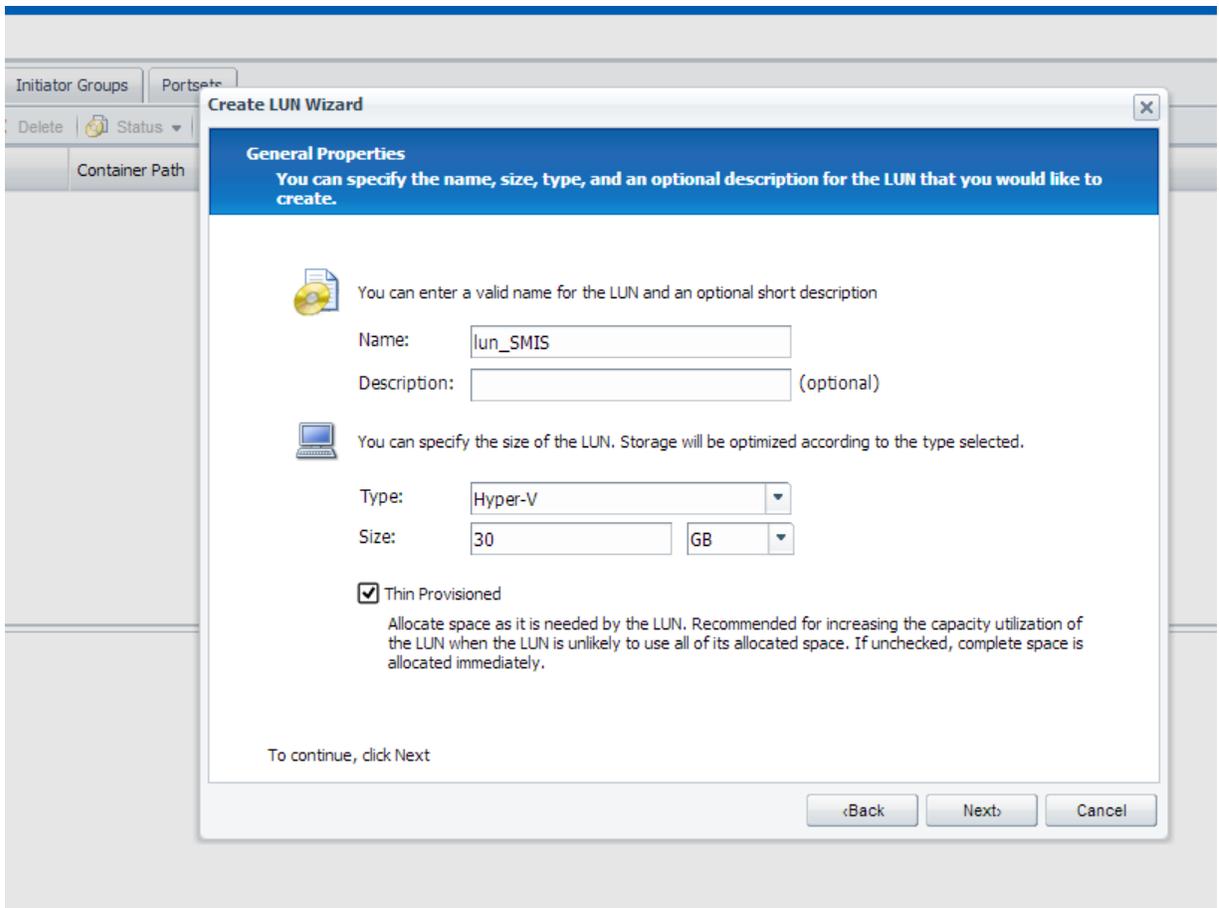
Buttons: Add... Remove Convert to CSV View Script OK Cancel

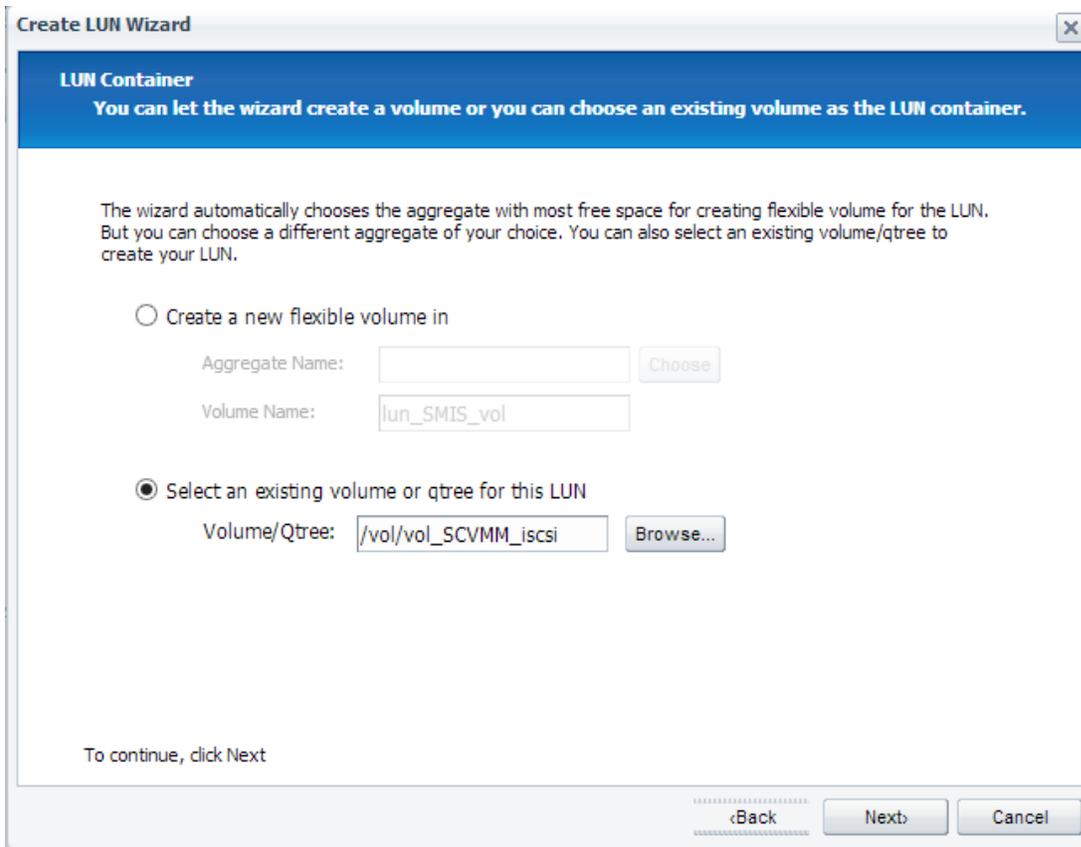


7.6 Creating a LUN on the NetApp Storage and Allocating It from SCVMM 2012

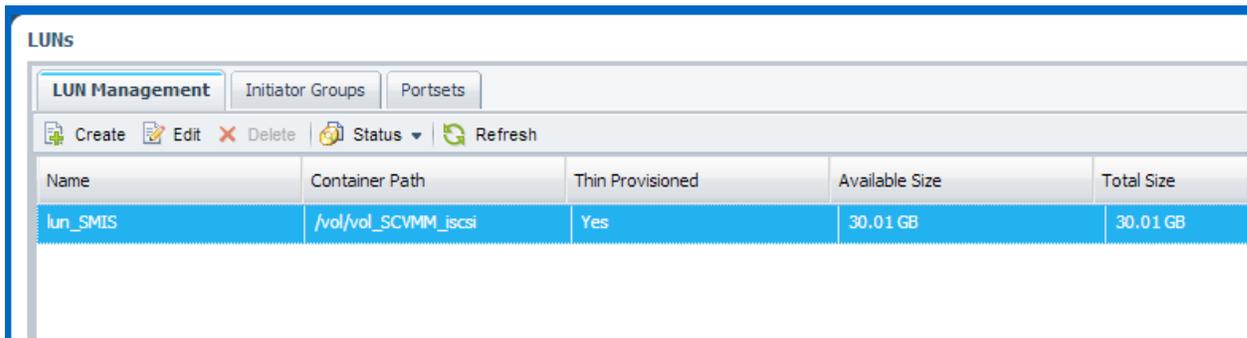
SCVMM integrated with SMI-S has the ability to allocate and connect the LUN, which is created on NetApp storage, to the Hyper-V servers.

1. Launch the **System Manager**, connect to a storage server, and create a new LUN, either thick or thin provisioned. (To accept the default of thick provisioning, clear the **Thin Provisioning** checkbox.) Select an existing **Volume/Qtree**, but do not map it to any target.

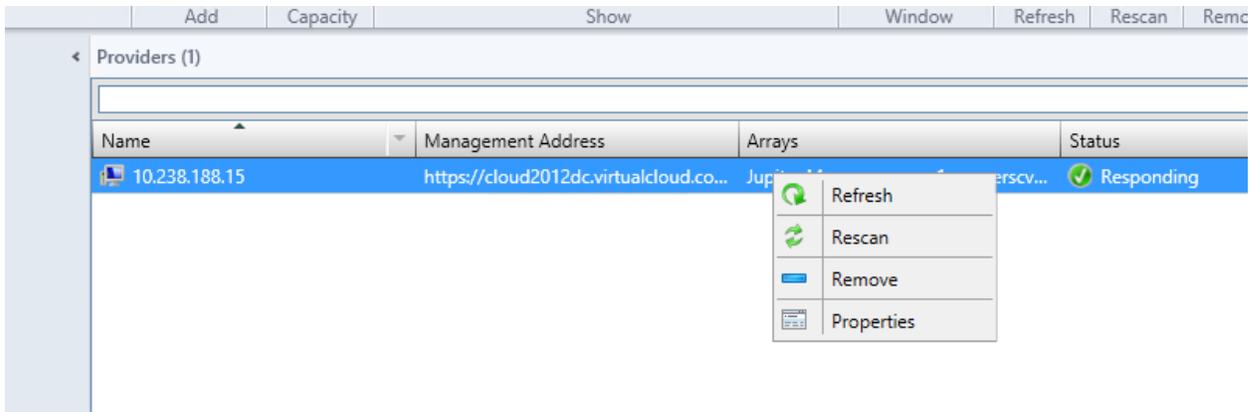




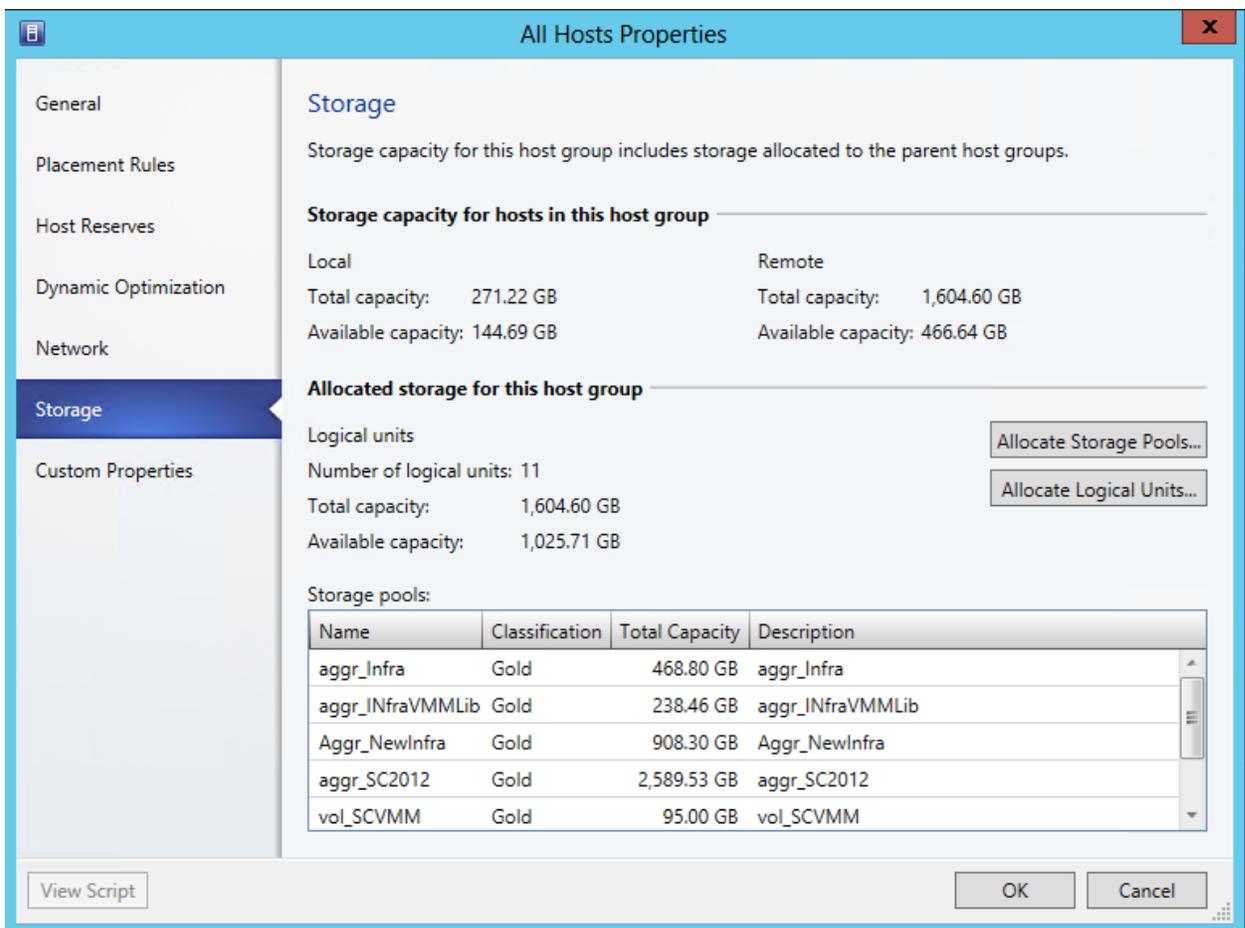
You will be able to see the LUN, which was created from the earlier step listed under **LUNs > LUN Management**.



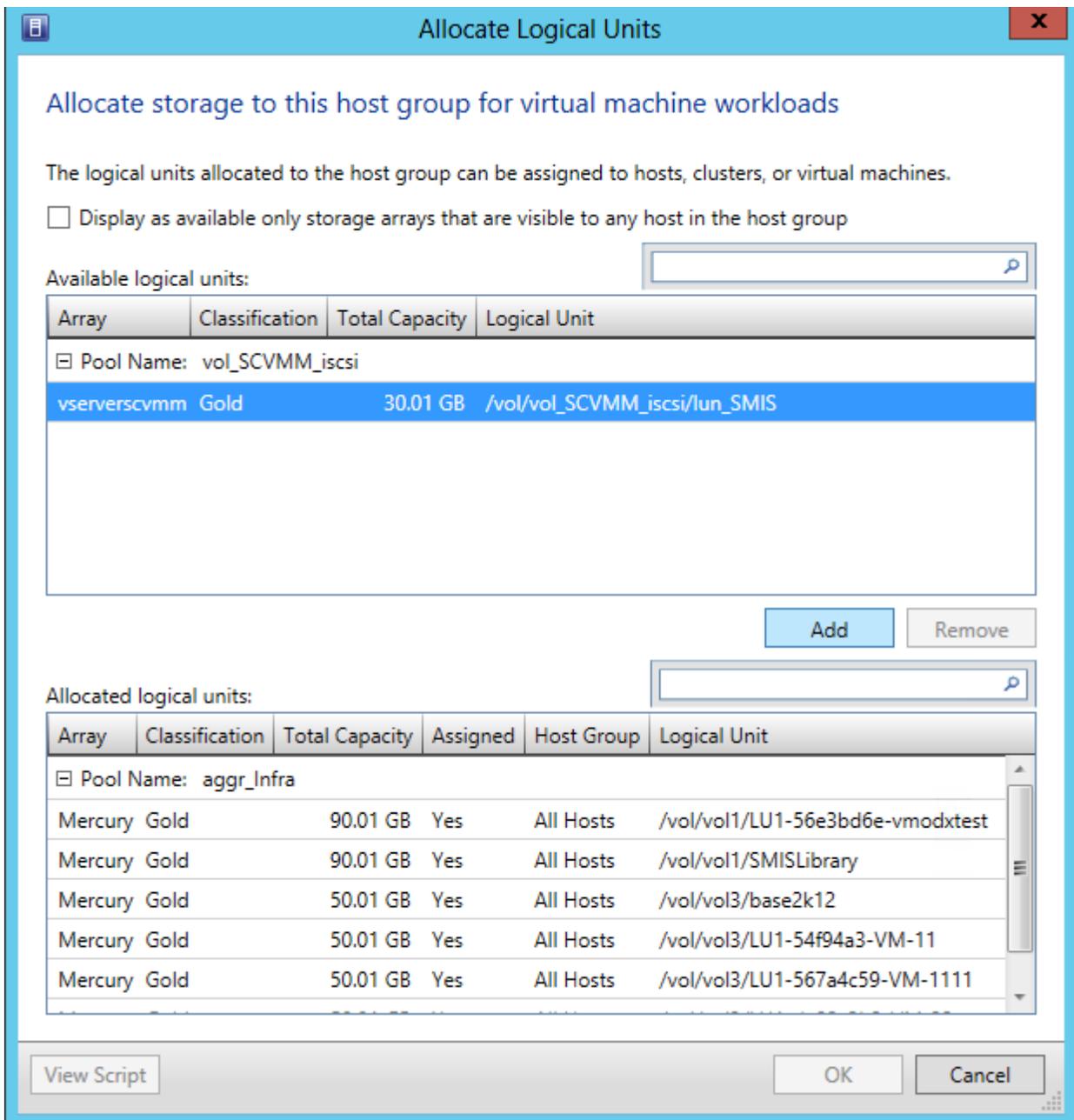
- Log in to **SCVMM 2012**, select **Fabric > Servers**, right-click a host group, and select **Properties**. On the **Storage** page, click the **NetApp SMI-S Provider** and then right-click **Rescan** to rescan the SMI-S Provider.



3. Navigate to **Fabric**. On a host group, select a Hyper-V host, right-click **Properties**, select **Storage**, and then click **Allocate Logical Units**.



4. Select a LUN and then click Add.



The LUN that is created manually on the NetApp storage can be used by the Hyper-V hosts' member of the host group.

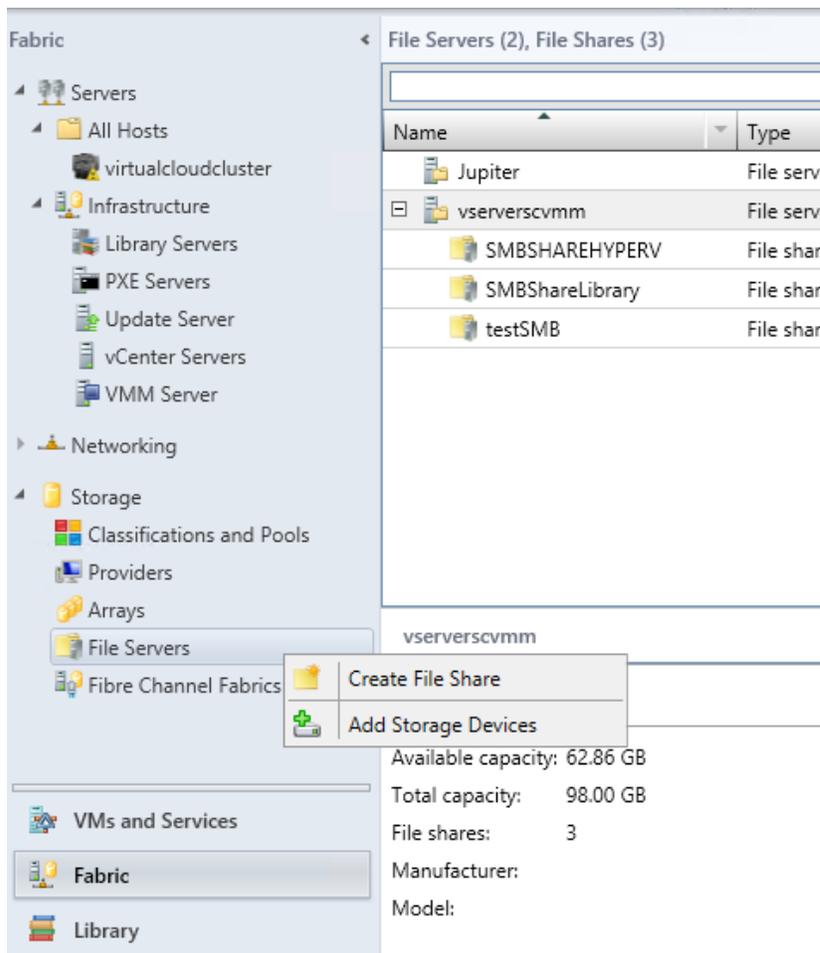
7.7 Provisioning a CIFS Share for SMB 3.0 Environments (Windows Server 2012)

Clustered Data ONTAP 8.2 supports the Hyper-V over SMB 3.0 feature in Windows Server 2012. Users can now create virtual machines and host them on CIFS shares that are continuously available on the NetApp storage systems.

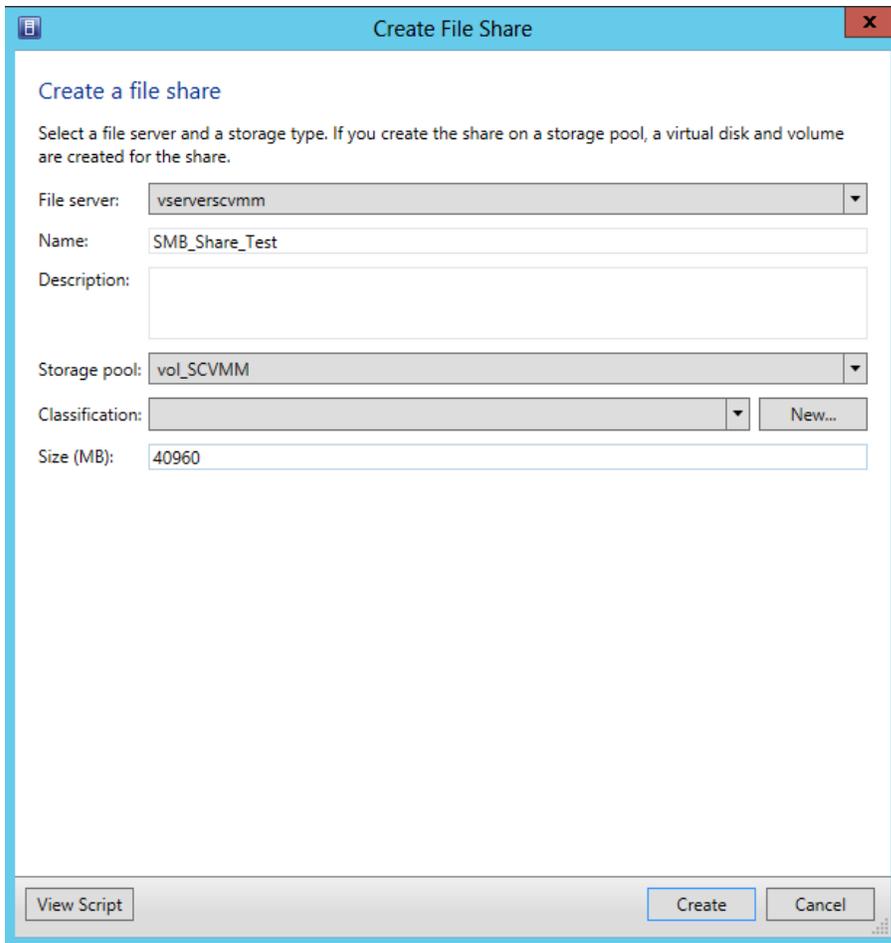
To complete the creation of a file share by using SCVMM 2012 R2, complete the following steps. Note that a CIFS storage virtual machine (SVM) must first be created on the clustered Data ONTAP storage system. The CIFS SVM is then listed as a file server and is available for file share creation.

Note: If SCVMM discovery fails; if SCVMM cannot create shares or clones; or if a CIFS server does not show up in the SCVMM even if it is configured in SVM, check the license status to make sure that the licenses have not expired. CIFS shares created by SnapDrive® for Windows (SDW) are not compatible with SMI-S. SDW creates shares on volumes. SMI-S creates and manages shares created on qtree with quotas assigned to them. To avoid security issues, the ACL "everyone" should be removed for such shares. The access status of shares may not turn green for 5 minutes after register operation. CIFS server takes a few seconds to apply those ACLs. SCVMM is quick enough to verify if share can be accessed on the host where it is registered and similarly check if it is inaccessible. Wait 5 minutes and try again. On the next verification step, SCVMM discovers that the share can be accessed on the host and refreshes the status of the registered shares.

1. In the **SCVMM 2012 R2** console, select **Fabric > Storage > File server**, right-click **File Server**, and then click **Create File Share**.



2. Enter a file share name and size and click **Add**.



The file share is created.

Name	Type	Classification	Status	Total Capacity	Available Capacity	Path
Jupiter	File server		OK	0 GB	0 GB	
vservercvmm	File server		OK	138.00 GB	102.86 GB	
SMB_Share_Test	File share	Gold		40.00 GB	40.00 GB	\\CIFSSCVMM\SMB_Share_Test
SMBSHAREHYPERV	File share	Gold		50.00 GB	50.00 GB	\\CIFSSCVMM\SMBSHAREHYP...
SMBShareLibrary	File share	Gold		40.00 GB	4.86 GB	\\CIFSSCVMM\SMBShareLibrary
testSMB	File share	Gold		8.00 GB	8.00 GB	\\CIFSSCVMM\testSMB

Note: All SMB 3.0 workflows are supported only on clustered Data ONTAP 8.2 and SCVMM 2012 R2.

Note: The SMI-S Agent does not expose root volumes, file shares in root volumes, or shares that are mounted to an entire volume.

To create a file share and use it in Windows, NetApp recommends creating the file share in an NTFS-only volume. This is to avoid problems with the credentials that access the file share.

1. To create the volume with NTFS, enter the following command:

```
vol create -vserver <vserver_name> -volume <volume_name> -aggregate
<aggr_name> -size<volume_size> -security-style ntfs
```

Note: SCVMM cannot discover storage objects if domain user is used for communication between SMIS and itself. Therefore, for this communication, a CIM server user, which has local

administrative rights on the SMI-S Provider, should be used. A local user should always be added to the SMI-S Provider and used to communicate with SCVMM.

For information about how to add a CIM server user, which has local administrative rights on the SMI-S Provider, refer to the [Data ONTAP SMI-S Agent 5.1 Installation and Configuration Guide](#).

CIFS shares created by SnapDrive 7.0 for Windows are not compatible with SMIS.

The SMI-S Provider has support to modify the share size. This cannot be done using SCVMM, but it can be accomplished by using the Data ONTAP PowerShell Toolkit or through the Data ONTAP CLI. Assume that two shares are listed in SCVMM:

[-] vservermbshare	File server		OK	80.00 GB
[-] cifsshare111	File share	Gold		40.00 GB
[-] cifsshare112	File share	Remote Storage		40.00 GB

2. Assume that that it is necessary to increase the share size of cifsshare111 from 40GB to 50GB. First, retrieve the quota details.

```
PS C:\Windows\system32> Get-NcQuota
QuotaType   QuotaTarget   Volume      Qtree        DiskLimit   FileLimit  Vserver
-----
tree        /vol/vol_SMBShare/SMBLIB  vol_SMBShare 41943040    - vservers...
tree        /vol/volSMB/cifsshare112  volSMB        41943040    - vservers...
tree        /vol/volSMB/cifsshare111  volSMB        41943040    - vservers...
```

3. Update the quota with the size you want for the share and then wait 5 minutes. Next, increase the size to 50GB.

```
PS C:\Windows\system32> Set-NcQuota -Path /vol/volSMB/cifsshare111 -DiskLimit 50gb -VserverContext vservermbshare
QuotaType   QuotaTarget   Volume      Qtree        DiskLimit   FileLimit  Vserver
-----
tree        /vol/volSMB/cifsshare111  volSMB        52428800    - vservers...
```

The SMI-S Provider updates its cache with any out-of-band changes on the system or SVM every 5 minutes.

4. Rescan on SCVMM so that the new size appears.

```
PS C:\> Get-SCStorageProvider | Read-SCStorageProvider
```

[-] vservermbshare	File server		OK	90.00 GB
[-] cifsshare111	File share	Gold		50.00 GB
[-] cifsshare112	File share	Gold		40.00 GB

You can perform similar steps using the Data ONTAP CLI.

5. Assume that you want to increase a share size from 10MB to 1GB. On the SVM console, enter:

```
quota policy rule modify -volume mount_test -target testshare -disk-limit 1024MB -
vserver share_name -policy-name default -type tree -qtree
```

Increasing the size of a share from 10MB to 1GB

```
user_cluster:>> quota policy rule show -vserver user_vs1
Vserver: user_vs1      Policy: default      Volume: mount_test
      User      Disk      Soft      Soft
      User      Disk      Files     Files
Type  Target  Qtree  Mapping  Limit  Limit  Limit  Limit  Threshold
-----
tree  testshare ""      -      10MB    -      -      -      -      -

user_cluster:>> quota policy rule modify -volume mount_test -target testshare -disk-limit 1024MB -vserver user_vs1 -policy-name default -type tree -qtree ""
user_cluster:>>
user_cluster:>> quota policy rule show -vserver user_vs1
Vserver: user_vs1      Policy: default      Volume: mount_test
      User      Disk      Soft      Soft
      User      Disk      Files     Files
Type  Target  Qtree  Mapping  Limit  Limit  Limit  Limit  Threshold
-----
tree  testshare ""      -      1GB    -      -      -      -      -
```

6. Wait 5 minutes for the SMI-S Agent cache to refresh. To view the change, rescan on SCVMM.

8 Use Cases for SMI-S and SCVMM Integration

8.1 Configuring NetApp Storage Arrays for VM Rapid Provisioning by Using SCVMM

SCVMM 2012 administrators can now deploy VMs by using rapid provisioning with NetApp SMI-S based SAN transfers. Rapid provisioning of VMs requires you to decide whether you want to use the default Snapshot copy method or the clone method that is built into SCVMM, or if you want to issue commands through Windows PowerShell for more granular control. In both methods, the SCVMM console can be used to expose those LUNs to the Hyper-V cluster or the standalone Hyper-V server. Two methods to quickly provision a LUN with a VM for SCVMM 2012 are the use of Snapshot copies and the use of clones. Traditionally, the terms Snapshot technology and clone are not similar to the Snapshot™ technology and FlexClone technology that NetApp uses. Snapshot copies can be created on most storage controllers almost instantaneously, using virtually no additional hard drive space beyond the deltas.

Storage controllers that use copy-on-write (CoW) Snapshot copies limit the number of allowed active copies because each copy degrades performance. To alleviate this problem, classic or legacy storage controllers offer a clone type operation in which the Snapshot copy is relocated (copied) to a fresh set of physical blocks, possibly in a new RAID set. This allows the copy to be released and performance to be returned to the baseline expectation. The disadvantage of a clone operation on classic or legacy controllers is that each clone can consume the same amount of storage on the controller as the original data. When deploying VMs on classic or legacy controllers, care must be taken to balance space consumption (clones) against performance expectations (Snapshot copies).

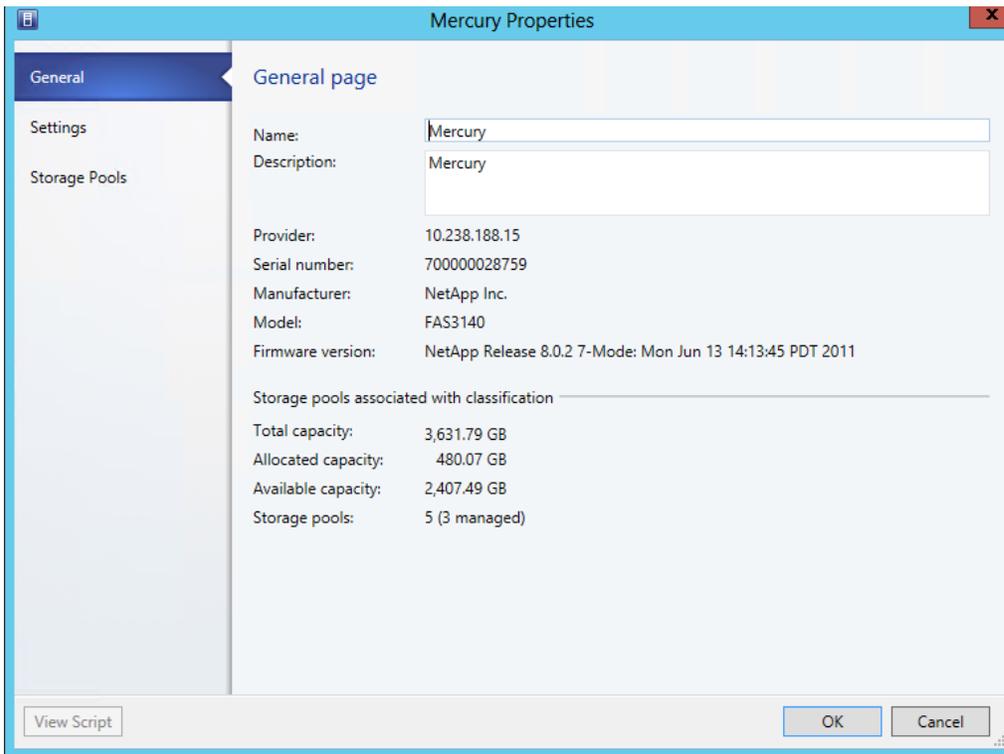
Because NetApp controllers use WAFL® (Write Anywhere File Layout) and not CoW-type Snapshot copies, they do not suffer performance degradation, and therefore the number of NetApp Snapshot copies per volume is relatively high (256). Also, the clone operation on a NetApp controller duplicates the original data, dramatically increasing the ability to scale. Performance generally increases greatly when Snapshot copy deployments of VMs are used instead of new copies, because common blocks are cached. Alternatively, clones can be used not to increase performance at the cost of disk space, but to allow administrative settings such as deduplication schedules, thin-provisioning fencing, and business continuity and disaster recovery operations to be configured uniquely.

You can license FlexClone software on NetApp storage systems when cloning LUNs by using the Data ONTAP SMI-S Agent. Snapshot copies and sub-LUN clones can exist between LUNs, but not across NetApp volumes. Deduplication also exists within a single LUN. When creating a set of VMs that are highly cloneable or that can be deduplicated, NetApp recommends keeping VMs not within just a single

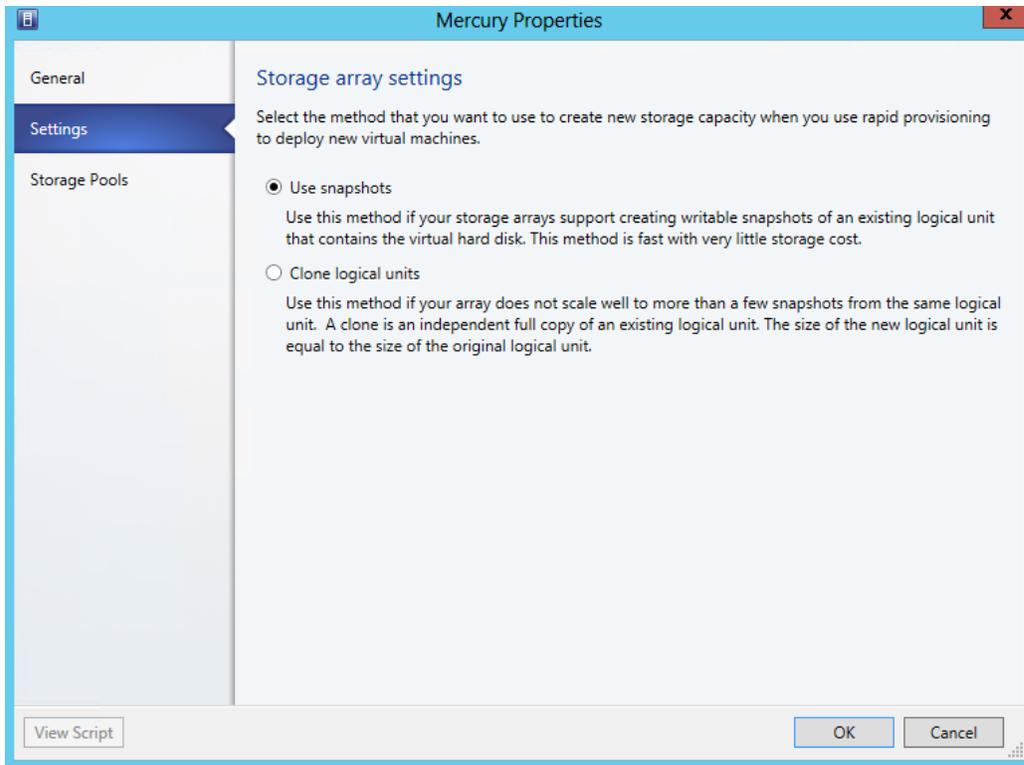
pool but in a single aggregate and a single NetApp volume. In an environment with extended read cache due to the addition of FlexCache® modules, this could mean a great boost in performance. For more information about the advantages of FlexCache, refer to [TR-3832: Flash Cache Best Practices Guide](#).

This rapid provisioning takes advantage of the Microsoft VSS framework by using NetApp Snapshot technology or clones from a source VM. The read/write NetApp storage copy of the source VM is created and assigned to a destination Hyper-V cluster or a standalone host. Because the source VM files are not transferred over the network, the VM deployment is much faster. To benefit from this new feature, it is necessary to use SCVMM 2012 VM templates. Administrators have the option of creating SAN copy-capable templates from new or existing VMs. The VM templates are stored in the SCVMM 2012 library to simplify administration. To implement SMI-S based rapid provisioning, NetApp Snapshot copies are used rather than clones.

1. In the **SCVMM** console, select **Fabric > Arrays**, right-click one of the storage arrays, and select its properties.



2. Select **Settings**, click **Use snapshots**, and then click **OK**.



Also, review the following [Microsoft TechNet](#) article:

9 Rapid Provisioning a Virtual Machine by Using SAN Copy

9.1 Creating SAN Copy Capable Templates for VM Rapid Provisioning by Using SCVMM

1. Before attempting this procedure, make sure that the iSCSI initiator is logged on to targets. This procedure creates two LUNs, one for highly available VMs and one for VMs placed on a standalone host.
2. Select **Fabric > Arrays** and click **Create thin storage logical unit**. Enter the name **HA-LUN**.

Create Logical Unit

Specify the settings for the new logical unit

Storage pool: aggr_Infra

Classification: Gold

Storage array: Mercury

Available capacity: 395.05 GB

Allocation percentage: 81 %

Name: HA-LUN

Description:

Size (GB): 50

Create thin storage logical unit with capacity committed on demand

Create a fixed size storage logical unit with capacity fully committed

View Script OK Cancel

- Repeat step 2 to create a 50GB LUN named **NON-HA-LUN**.

Create Logical Unit

Specify the settings for the new logical unit

Storage pool: aggr_Infra

Classification: Gold

Storage array: Mercury

Available capacity: 395.05 GB

Allocation percentage: 81 %

Name: NON-HA-LUN

Description:

Size (GB): 50

Create thin storage logical unit with capacity committed on demand

Create a fixed size storage logical unit with capacity fully committed

View Script OK Cancel

4. The LUNs are displayed under Classifications and Pools.

Name	SM Name	Type	Size
aggr_Infra	aggr_Infra	Storage p...	468.12 GB
NON-HA-LUN	/vol/vol5/NON-HA-LUN	Logical unit	50.01 GB
HA-LUN	/vol/vol4/HA-LUN	Logical unit	50.01 GB

5. To allocate the LUNs to the All Hosts group, select **Fabric > Servers**, right-click **All Hosts**, select **Properties**, and select **Storage**.

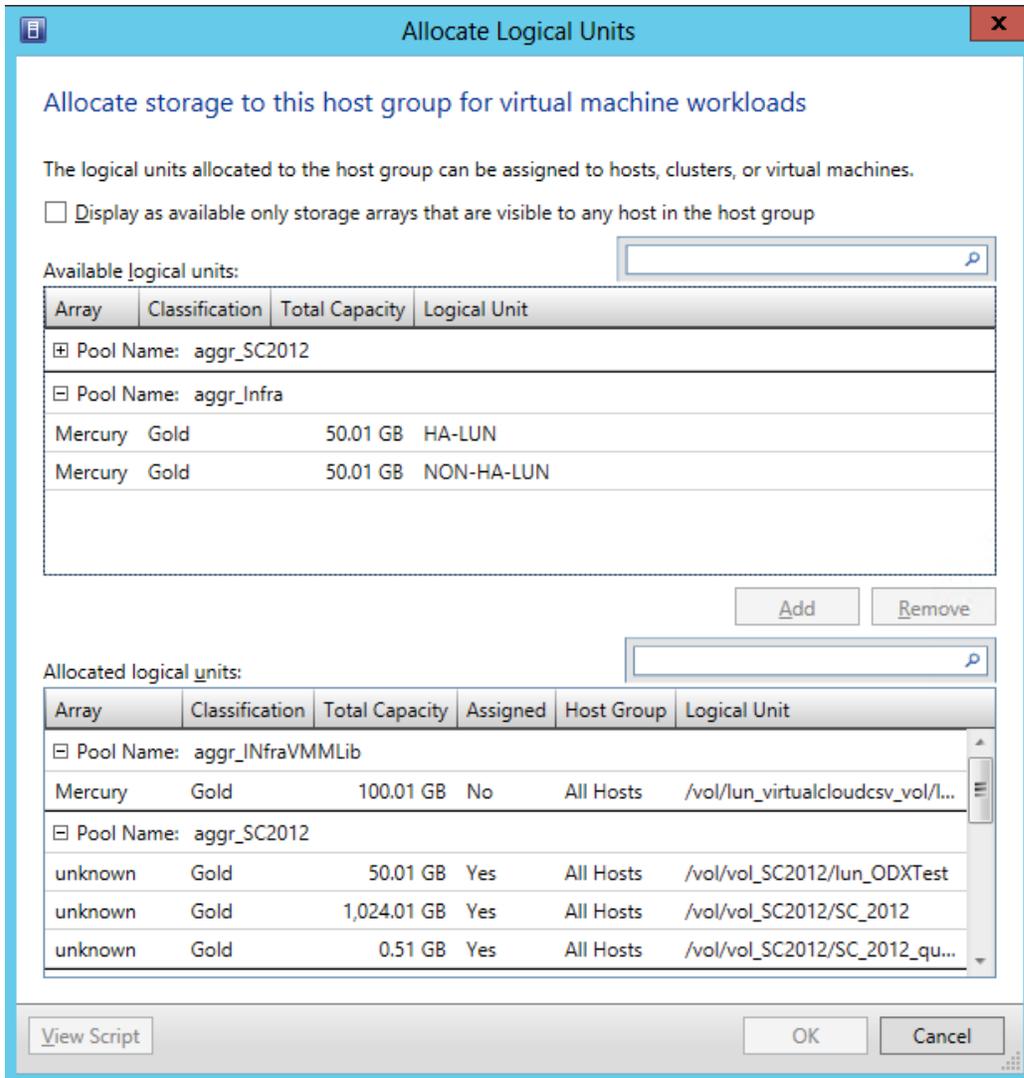
The screenshot shows the 'All Hosts Properties' dialog box with the 'Storage' tab selected. The left sidebar shows the navigation tree with 'Fabric' > 'Servers' > 'All Hosts' selected. The main pane displays the following information:

- Storage capacity for hosts in this host group**
 - Local: Total capacity: 407.72 GB, Available capacity: 215.19 GB
 - Remote: Total capacity: 1,074.52 GB, Available capacity: 221.74 GB
- Allocated storage for this host group**
 - Logical units: Number of logical units: 8
 - Total capacity: 510.07 GB
 - Available capacity: 211.04 GB
- Storage pools table:**

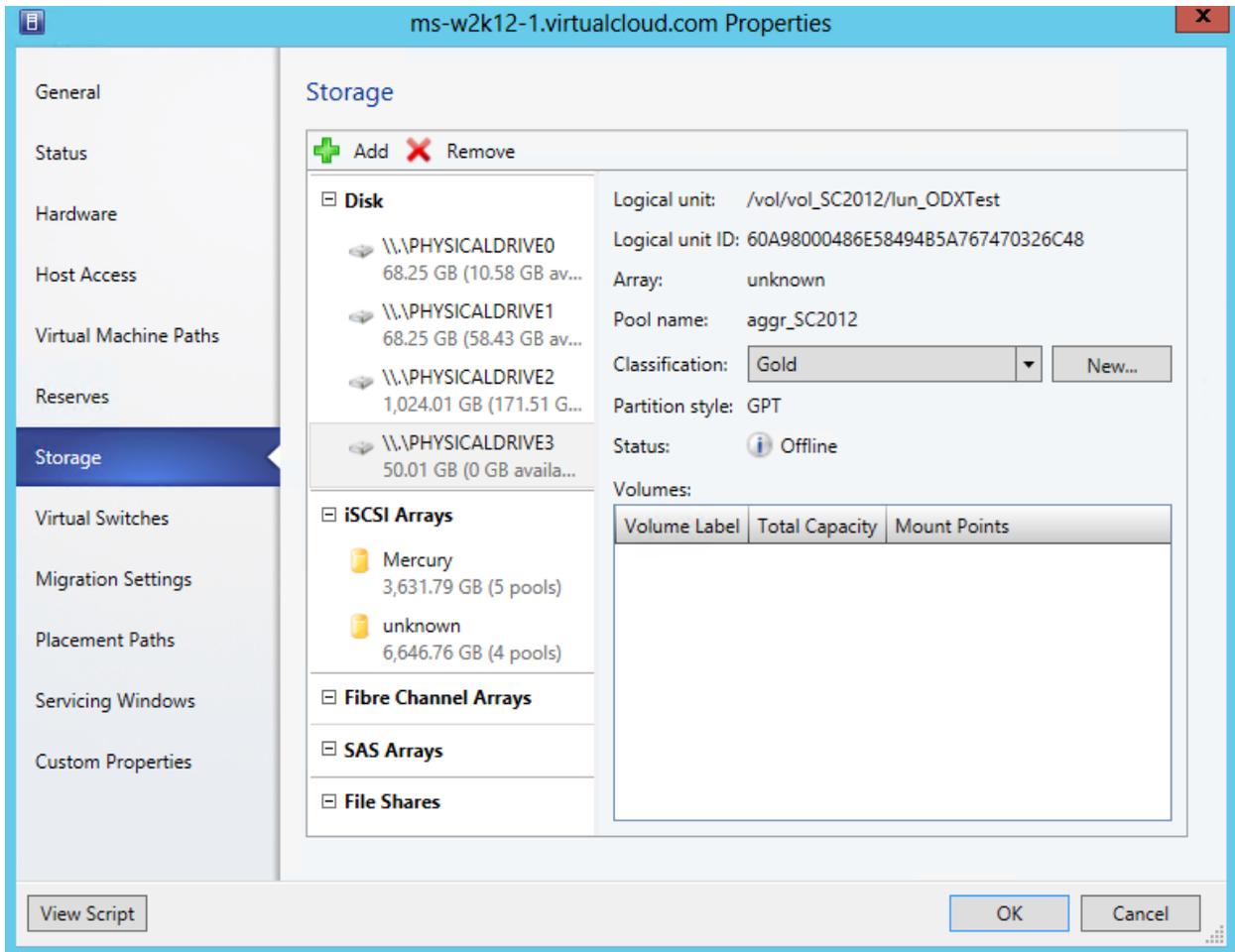
Name	Classification	Total Capacity	Description
aggr_Infra	Gold	468.12 GB	aggr_Infra
aggr_InfraVMMLib	Gold	238.45 GB	aggr_InfraVMMLib
Aggr_NewInfra	Gold	908.30 GB	Aggr_NewInfra
vol_SCVMM_iscsi	Gold	150.00 GB	vol_SCVMM_iscsi

Buttons at the bottom include 'View Script', 'Allocate Storage Pools...', 'Allocate Logical Units...', 'OK', and 'Cancel'.

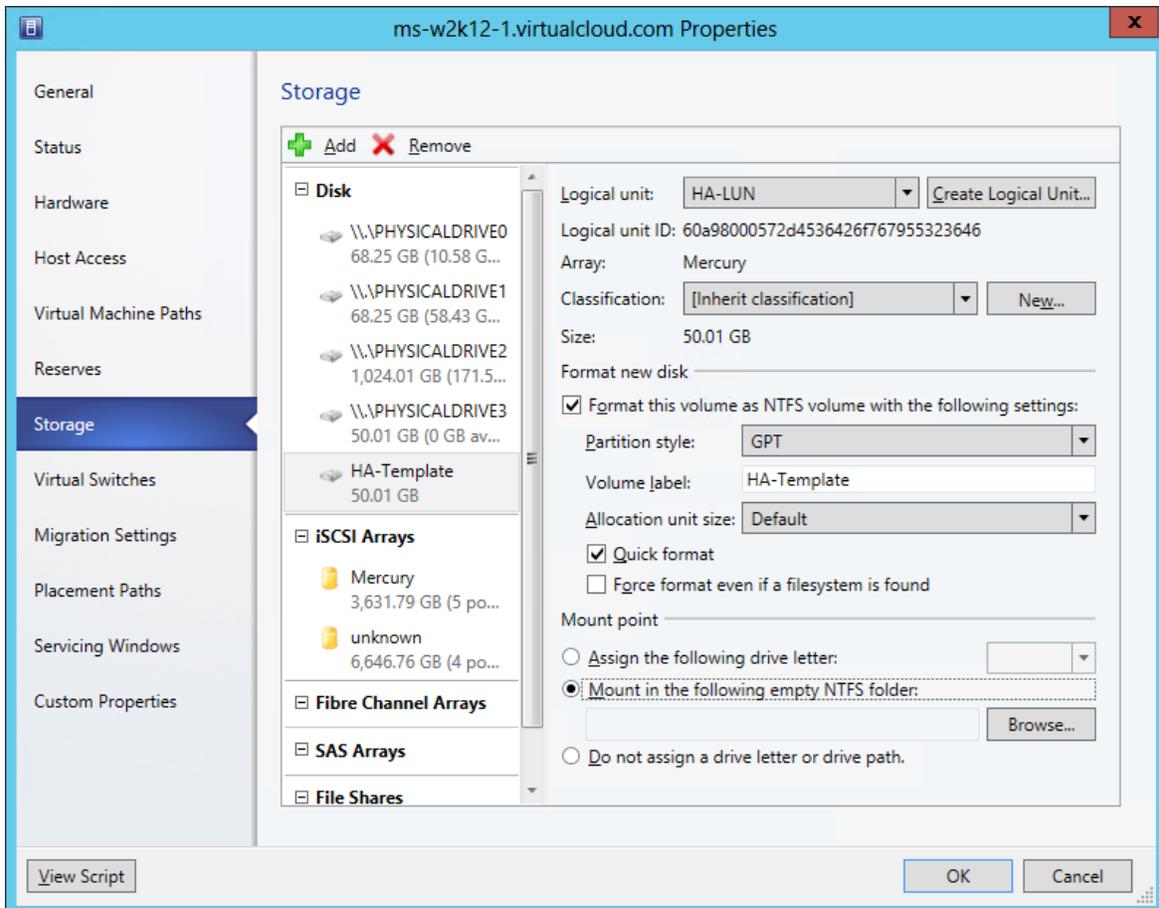
6. Click **Allocate Logical Units**. Allocate the **Available Logical Units** to **Allocated Logical Units**, and then click **OK**.



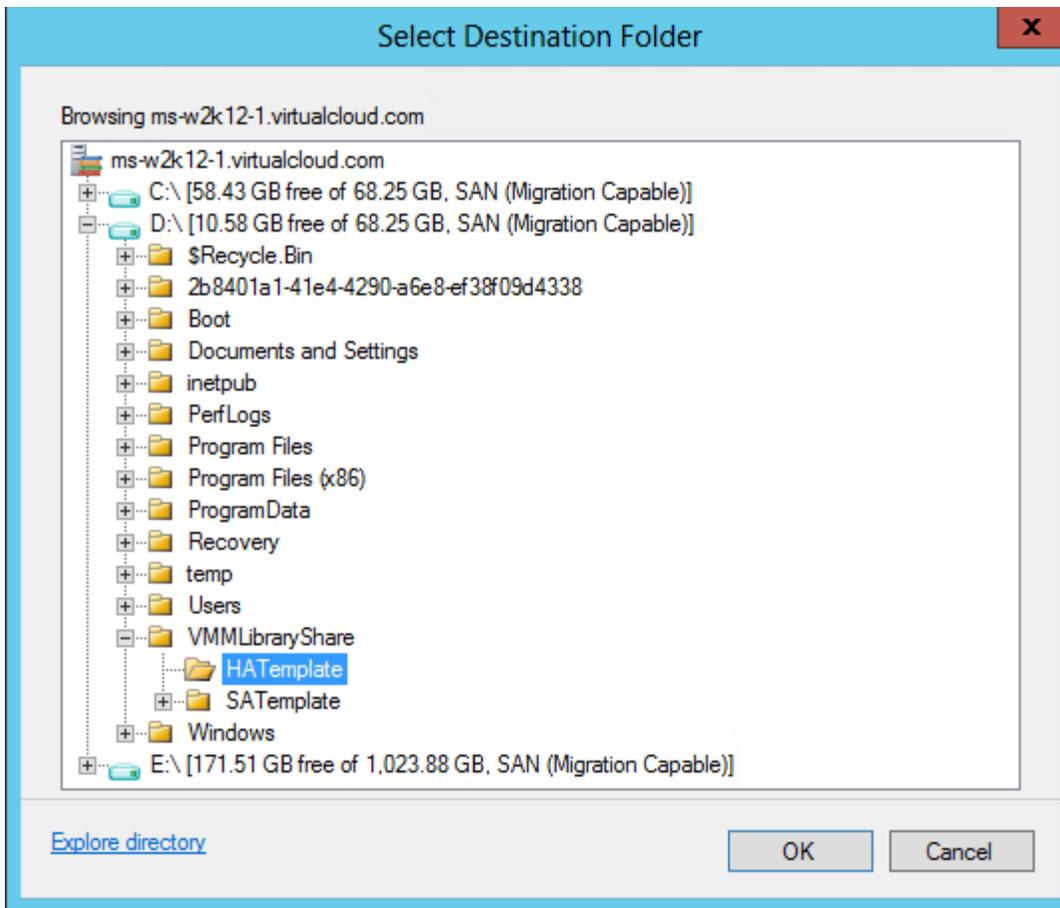
7. Select **Fabric > Servers** and then select a **Library host**. Right-click it, select **Properties**, and then select **Storage**. Click **Add**.



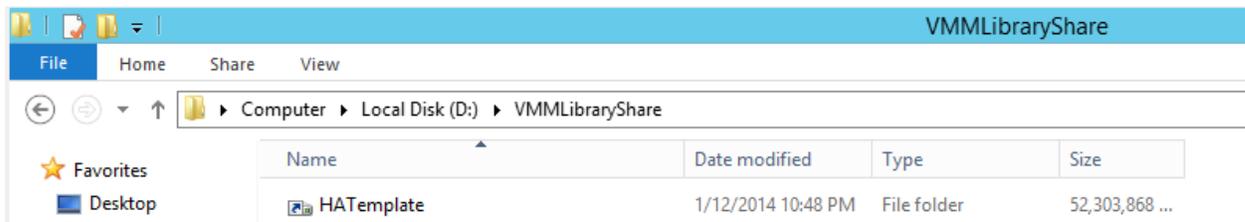
8. Select the new **LUN (HA-LUN)** from the **Logical unit** drop-down list, select the checkbox to format as NTFS, give it the volume label **HA-Template**, and select an empty **NTFS folder** in which to mount it.



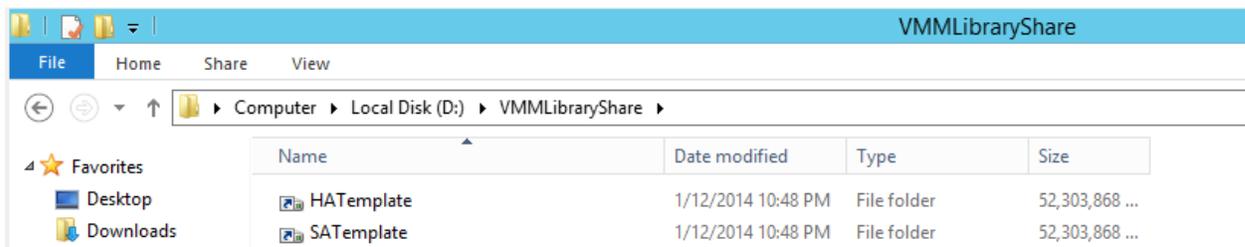
9. Select the **HA Template** folder under your library share. (If you need to create an empty directory, click the **Explore directory** link.) Click **OK**.



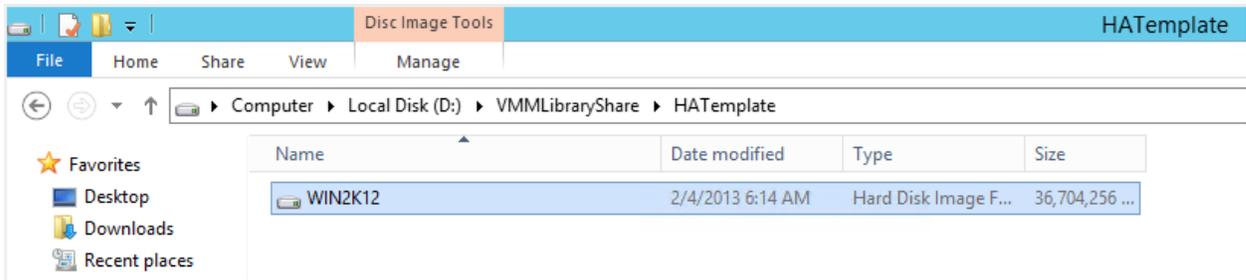
10. The mount point is listed in the HA Template directory of your library server.



11. Perform steps 7, 8, and 9 for the **NON-HA-Template** and verify that the **SA Template** mount point is also listed.



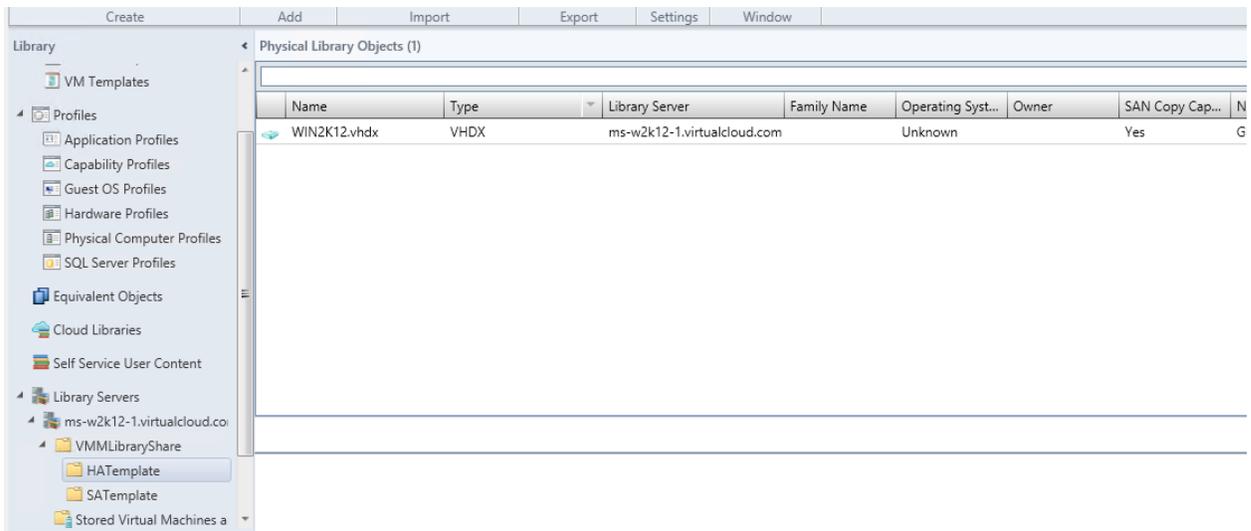
12. Copy the VHD (in this example, a Win2K12 VHDX file) to use for SAN provisioning to both of the folders. The VHD appears in the folder.



13. In the **SCVMM** console, select **Library > Library Servers**. Right-click the library share and select **Refresh**.



14. When the library share refresh is complete, return to the library share, select the folder in which you mounted the LUN, and select the VHD. Verify that **SAN Copy Capable** is set to **Yes**.



15. Create two VM templates based on the VHDs, one for high availability and the other for a standalone host. Provision the VMs as described in section 9.2 “Creating a Virtual Machine Template.”

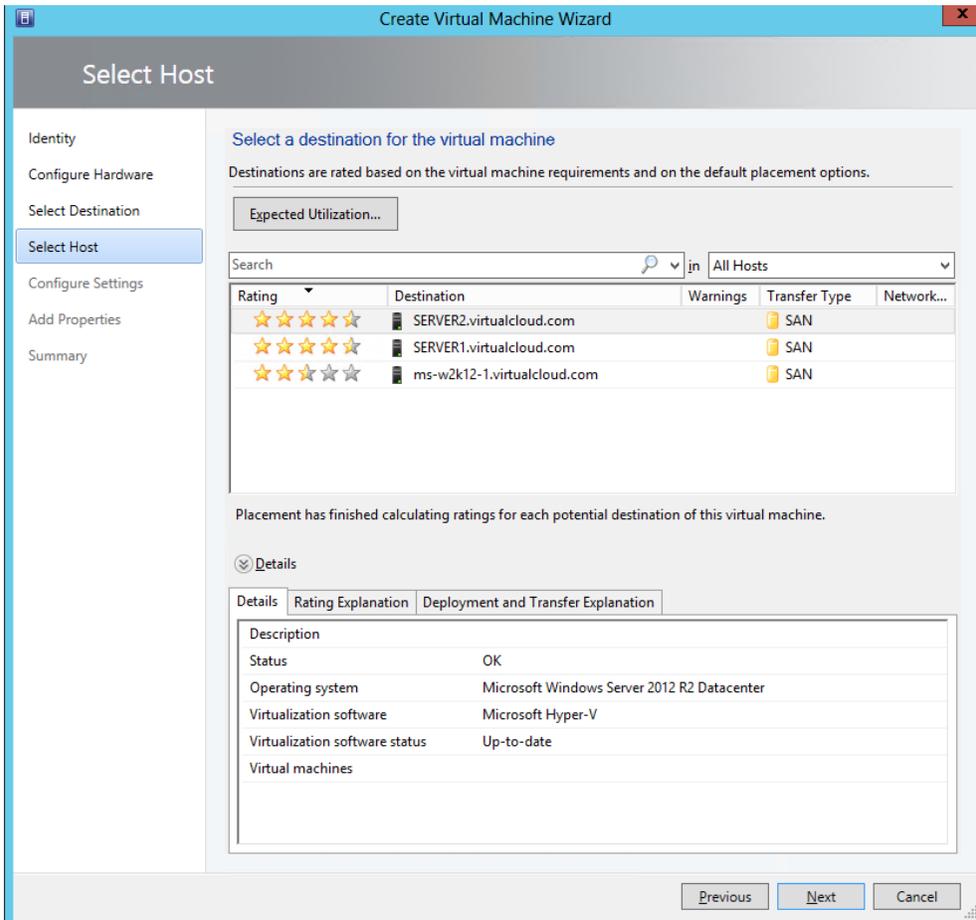
For information about how to create a VM template that is based on an existing virtual hard disk, go to the [Microsoft TechNet](#).

9.2 Creating a Virtual Machine Template

For information about how to create a virtual machine template, refer to [Microsoft TechNet](#).

9.3 Provisioning Virtual Machines from Template Using SAN Copy

Note: To validate a SAN copy, when you provision VMs, the **Select Host** pane should show the transfer type as SAN.

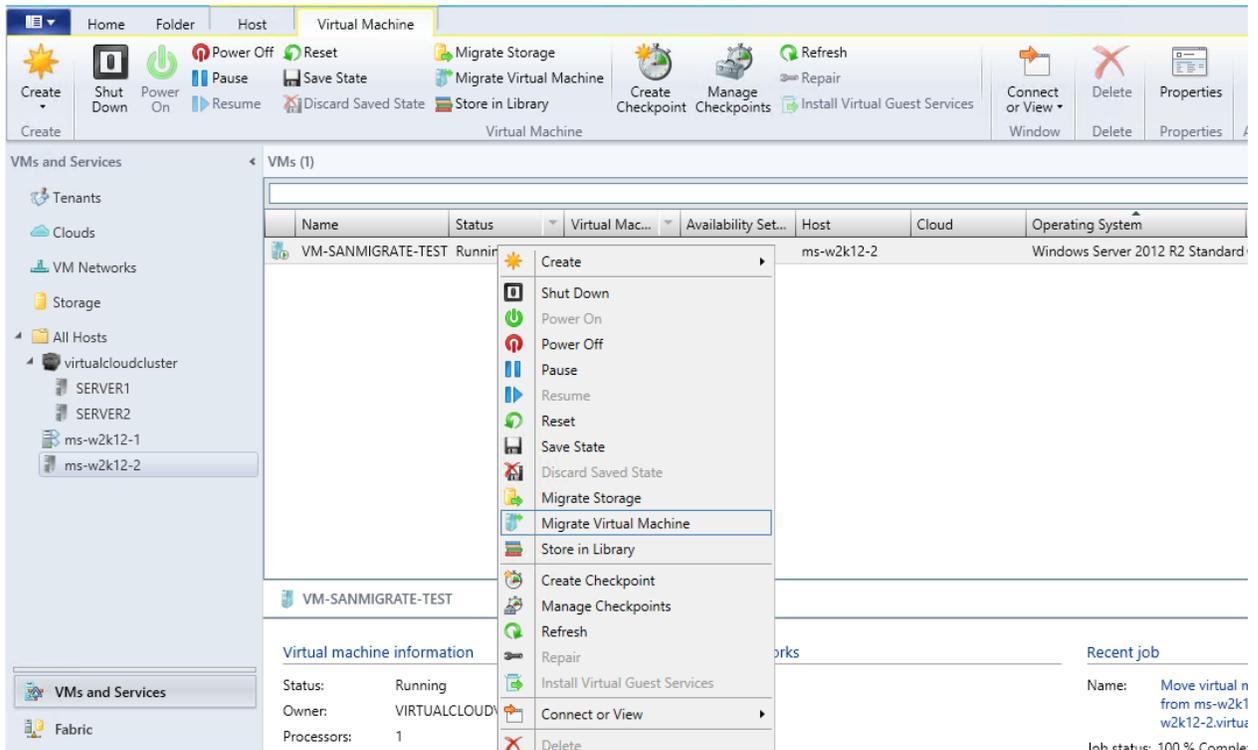


9.4 Using SCVMM for VM SAN Migration

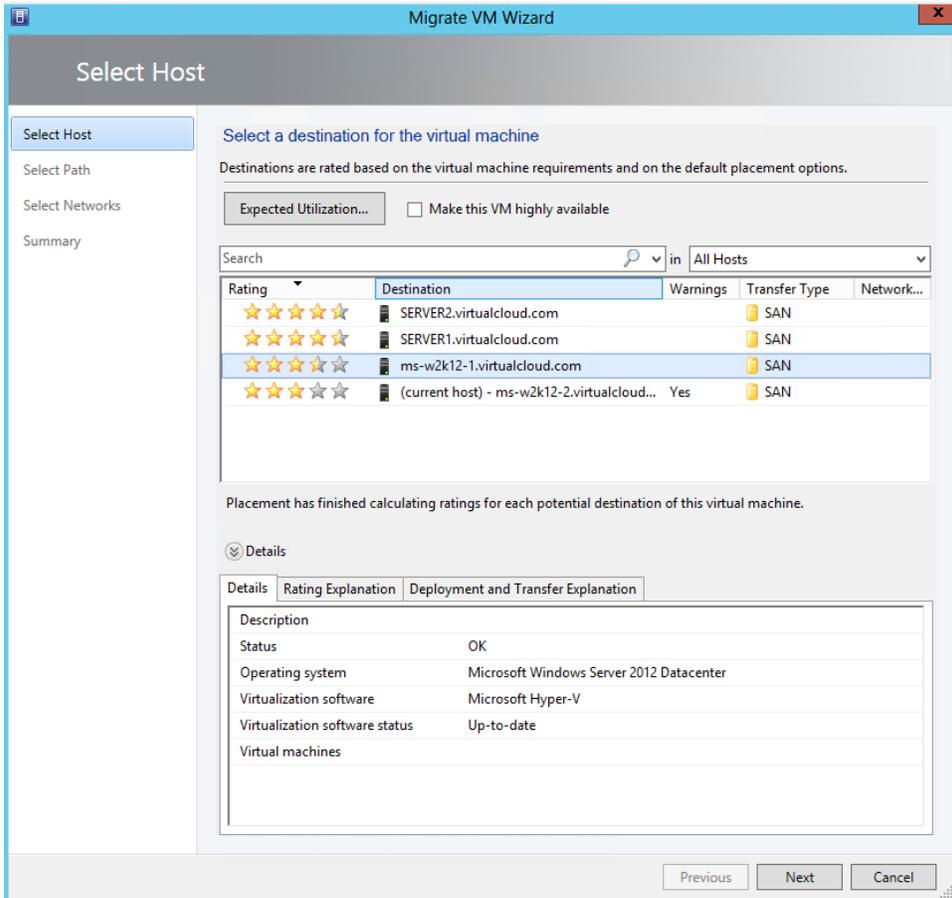
VMs that are running on a cluster SCVMM use live migration to move the VMs across the cluster. SAN migration is used to move VMs across different clusters or between standalone hosts.

The following procedure shows how to migrate VMs across standalone hosts by using VM migration and SAN migration.

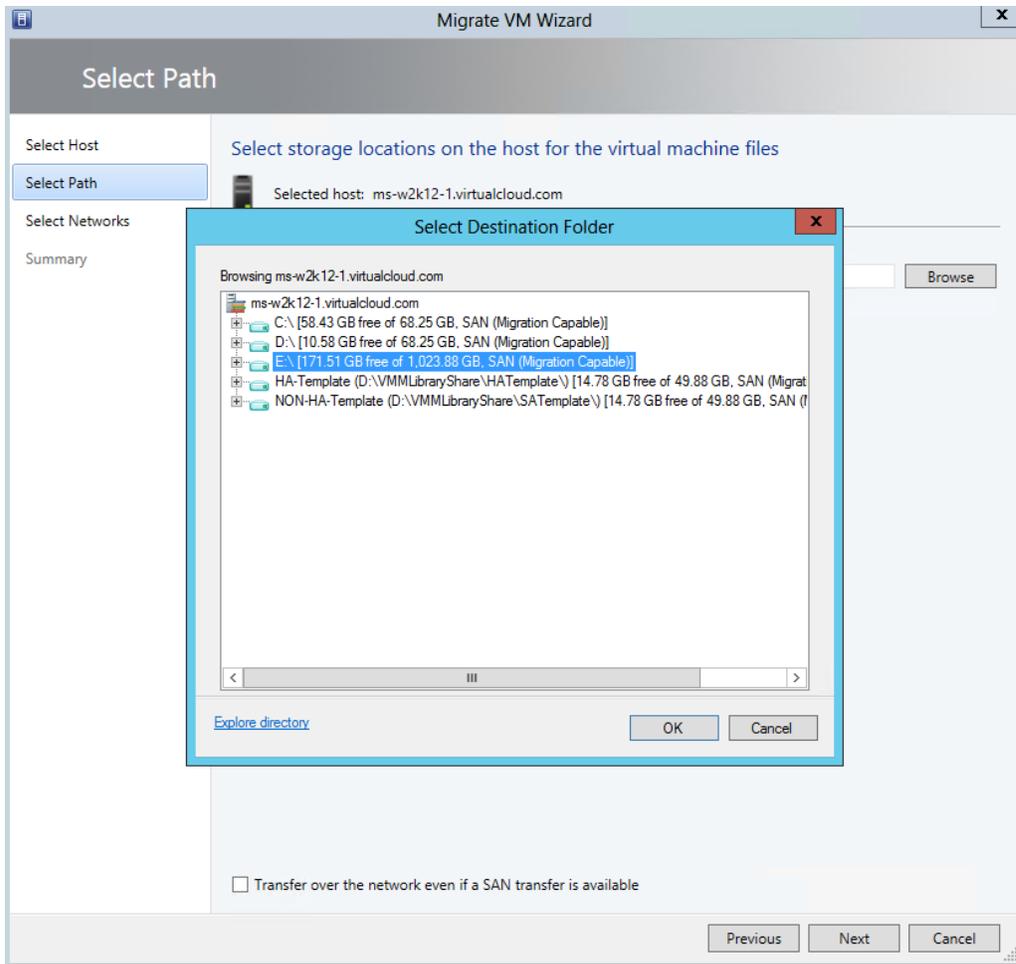
1. Open the **SCVMM** console, right-click the VM placed on the standalone host, and select **Migrate Virtual Machine**.



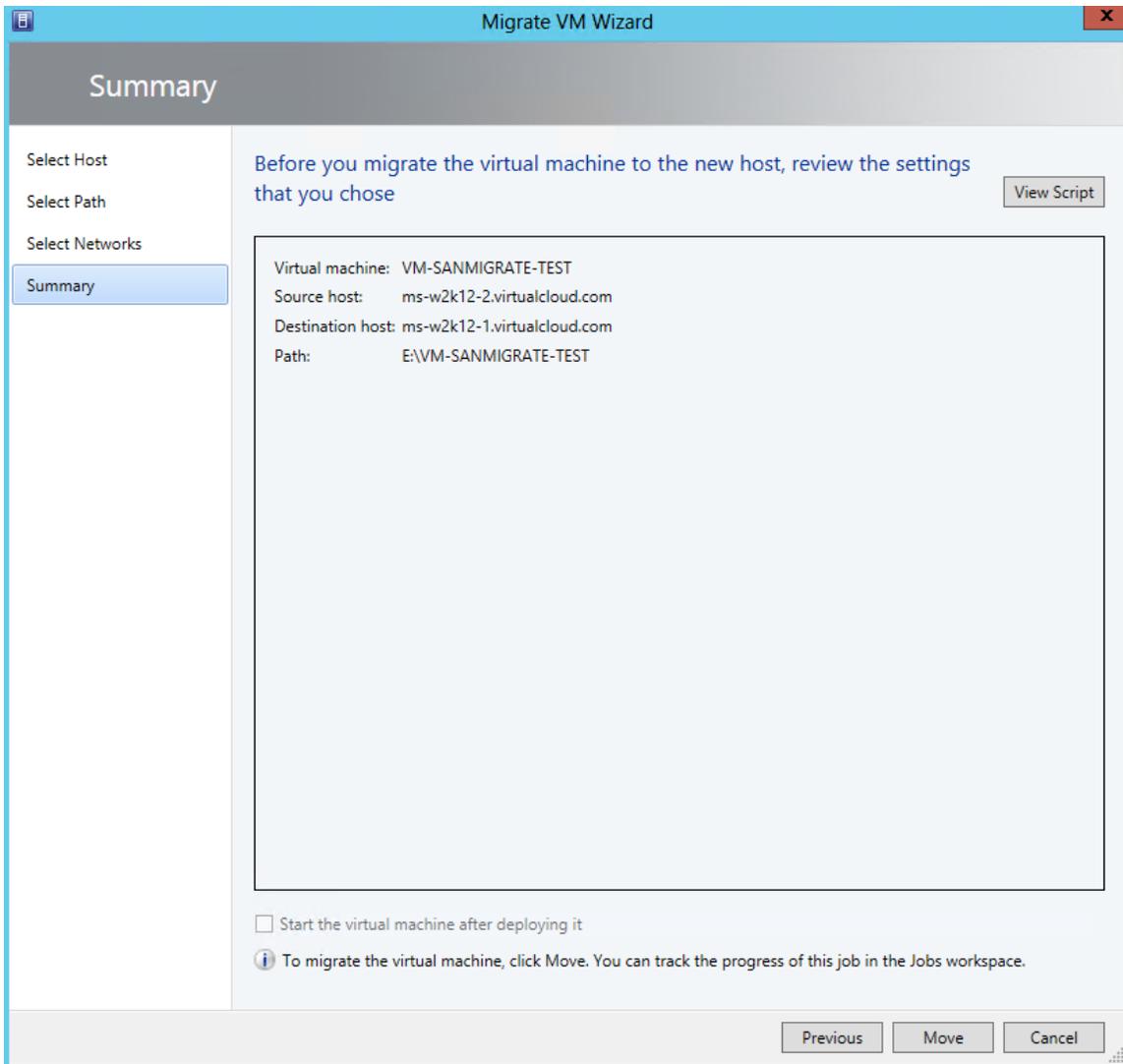
2. Select a standalone host and click **Next**. Select the **Transfer Type SAN** and click **Next**.



3. Click **Browse** and select a destination folder, click **OK**, and then click **Next**.



4. Review the summary page and then click **Move** to migrate the VM.



5. Monitor the status of the job to make sure that it completes successfully.

Jobs

Recent Jobs (2)

Name	Status	Start Time	Result Name	Owner
Deploy virtual machine	45 %	1/13/2014 7:39:49 PM	VM-SANMIGRATE-TEST	VIRTUALCLOUD\Administrator
Move virtual machine VM-SANMIGRATE-TEST from...	Completed	1/13/2014 6:59:39 PM	VM-SANMIGRATE-TEST	VIRTUALCLOUD\Administrator

Move virtual machine VM-SANMIGRATE-TEST from ms-w2k12-2.virtualcloud.com to ms-w2k12-1.virtualcloud.com using SAN

Status: 45 %

Command: Move-SCVirtualMachine

Result name: VM-SANMIGRATE-TEST

Started: 1/13/2014 7:39:49 PM

Duration: 00:00:02

Owner: VIRTUALCLOUD\Administrator

Step	Name	Status	Start Time	End Time
1	Move virtual machine V...	45 %	1/13/2014 7:39:49 PM	
1.1	Run pre checks for transfer	Completed	1/13/2014 7:39:50 PM	1/13/2014 7:39:52 PM
1.2	Change virtual machine s...	Completed	1/13/2014 7:39:53 PM	1/13/2014 7:40:00 PM
1.3	Export Hyper-V virtual m...	Completed	1/13/2014 7:40:00 PM	1/13/2014 7:40:00 PM
1.4	Deploy file (using LAN)	Completed	1/13/2014 7:40:00 PM	1/13/2014 7:40:00 PM
1.5	Deploy file (using LAN)	Not started		
1.6	Deploy file (using SAN tr...	50 %	1/13/2014 7:40:00 PM	
1.7	Import Hyper-V virtual m...	Not started		

Summary | Details | Change Tracking

Show this window when new objects are created

Restart | Cancel

6. When the job is complete, you can see that the VM was successfully migrated to the Hyper-V host.

Server Tools Administrator - scvmm2012r2.virtualcloud.com - Virtual Machine Manager

Home | Folder | Host

Create Service | Create Virtual Machine | Create Cloud | Create Host Group | Create VM Network | Assign Cloud | Overview | VMs | Services | VM Networks | Manage OCPM Hosts | PowerShell | Jobs | PRO

VMs and Services

- Tenants
- Clouds
- VM Networks
- Storage
- All Hosts
 - virtualcloudcluster
 - SERVER1
 - SERVER2
 - ms-w2k12-1
 - ms-w2k12-2

VMs (1)

Name	Status	Virtual Mac...	Availability Set...	Host	Cloud	Operating System
VM-SANMIGRATE-TEST	Running	Running		ms-w2k12-1		Windows Server 2012 R2 Standard

9.5 Leveraging the SCVMM 2012 R2 Offload Data Transfer Feature for VM Rapid Provisioning by Using SCVMM

Copy offload (ODX) is a mechanism to perform full-file or subfile copies between two directories residing on remote servers, where the server can be the same or different. The copy is created by copying data between the servers (or the same server if both source and destination files are on the same server) without the client reading the data from the source and writing to the destination. This reduces the client/server processor/memory utilization and minimizes network I/O bandwidth.

With Windows Server 2012, Microsoft introduced a copy offload mechanism that enables you to offload the activity of copying files between two servers to the storage system. Data ONTAP SMI-S 5.1 supports ODX with System Center 2012 R2 and clustered Data ONTAP 8.2.

SMB to SMB

This scenario deploys VMs from virtual hard disks (VHD and VHDX) placed on an SMB share to a Hyper-V over SMB infrastructure. Source and destination shares must be on the same volume for faster ODX performance (uses sis-clone engine). You create the template on the source share and provision VMs on the destination share. For efficiency, the source (library) and destination (LUN/share) should be in the same pool (in this case, NetApp FlexVol® volumes). NetApp recommends using ODX within a volume. Performance is degraded if intervolumne ODX and internode ODX are used.

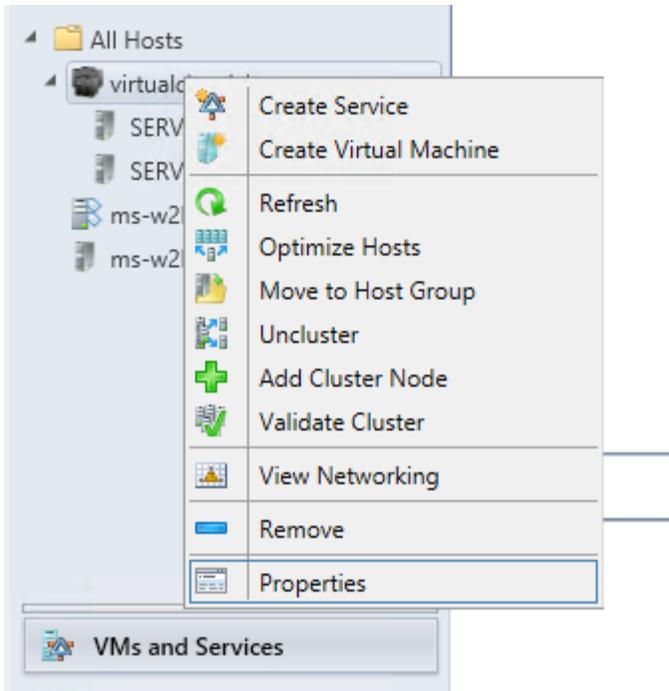
1. On the SCVMM console, create two file shares.

[-] vserversmbshare	File server	OK	80.00 GB
[-] cifsshare111	File share	Gold	40.00 GB
[-] cifsshare112	File share	Remote Storage	40.00 GB

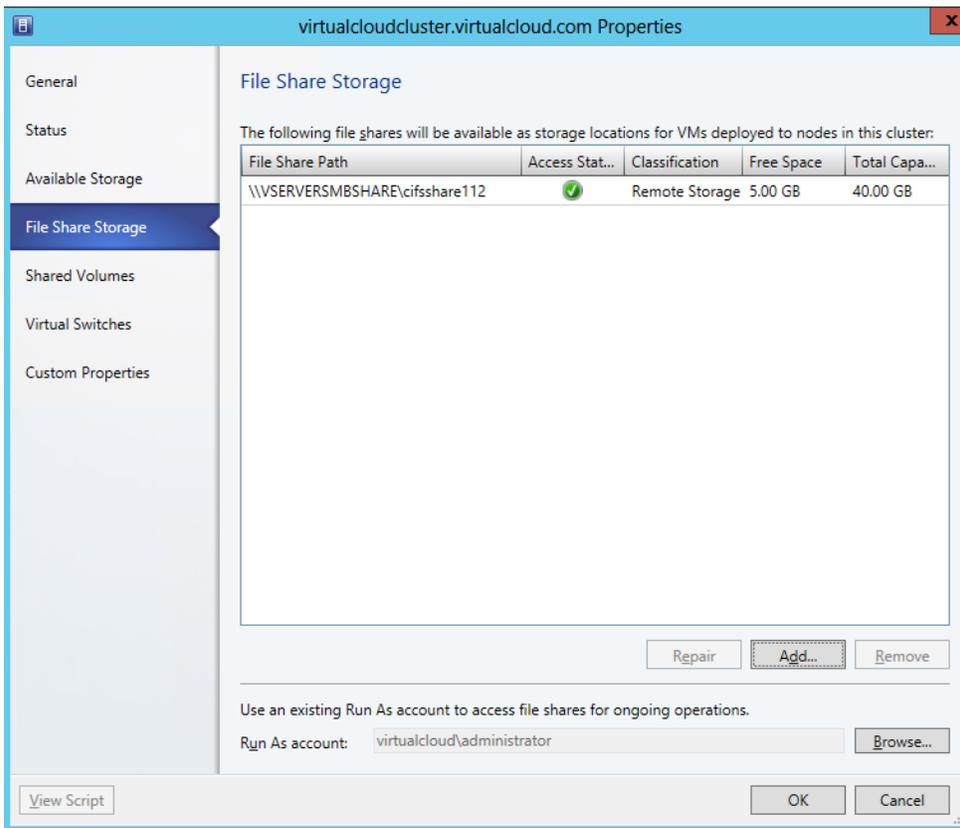
2. Attach one of the file shares to the SCVMM library server and the other to the Hyper-V host. For information about how to create CIFS file shares, see section 7.7 “Provisioning a CIFS Share for SMB 3.0 Environments (Windows Server 2012).”
3. Right-click the Library server and add one of the cifsshare as a library share. Copy the desired VHD to the library share and click Refresh. The VHDX file appears.

Name	Type	Library Server	Family Name	Operating Syst...
SCOM2012SP1.vhdx	VHDX	ms-w2k12-1.virtualcloud.com		Unknown

4. In the SCVMM console, select VMs and Services. Right-click the cluster name and select Properties.



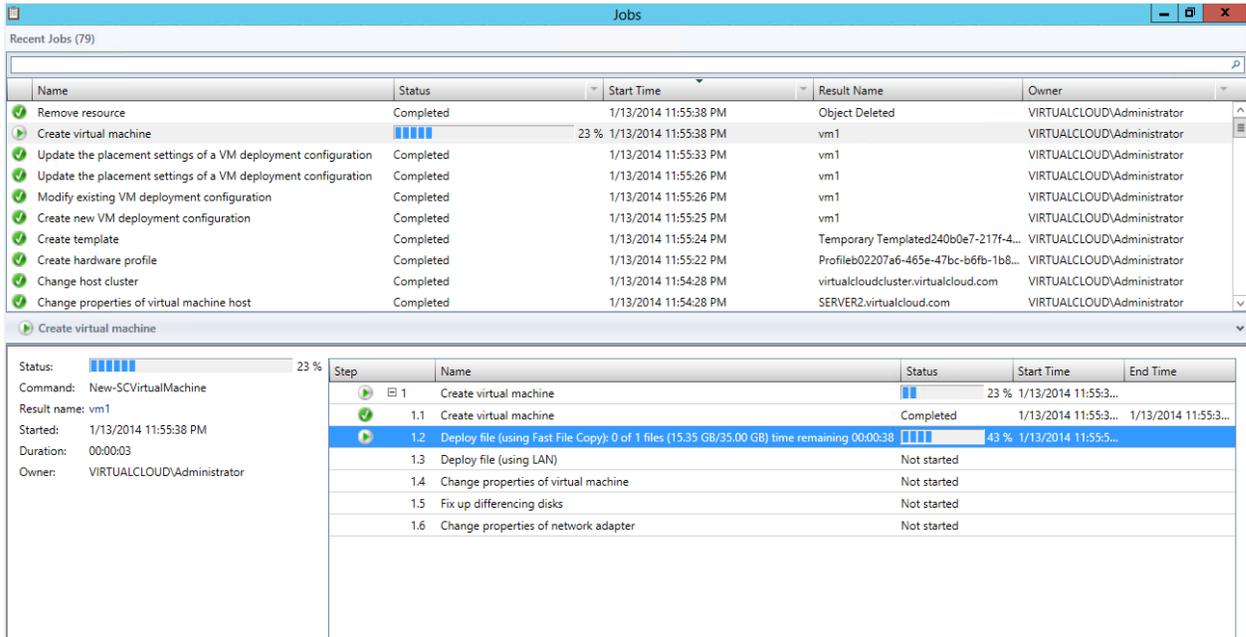
5. Select **File Share Storage** and add a CIFS share to be used as file share storage.



- Provision VMs from the VHD residing on the CIFS library share to the Hyper-V clusters file share storage. During the provisioning process, the deploy file section is highlighted (using Fast File Copy), which means that ODX-based copy is being used.

Fast File Copy in System Center 2012 R2 VMM greatly improves the speed of file transfers and virtual machine deployments, mostly by leveraging the Windows ODX feature.

For details, refer to the Microsoft TechNet link [Creating and Deploying Virtual Machines Overview](#).



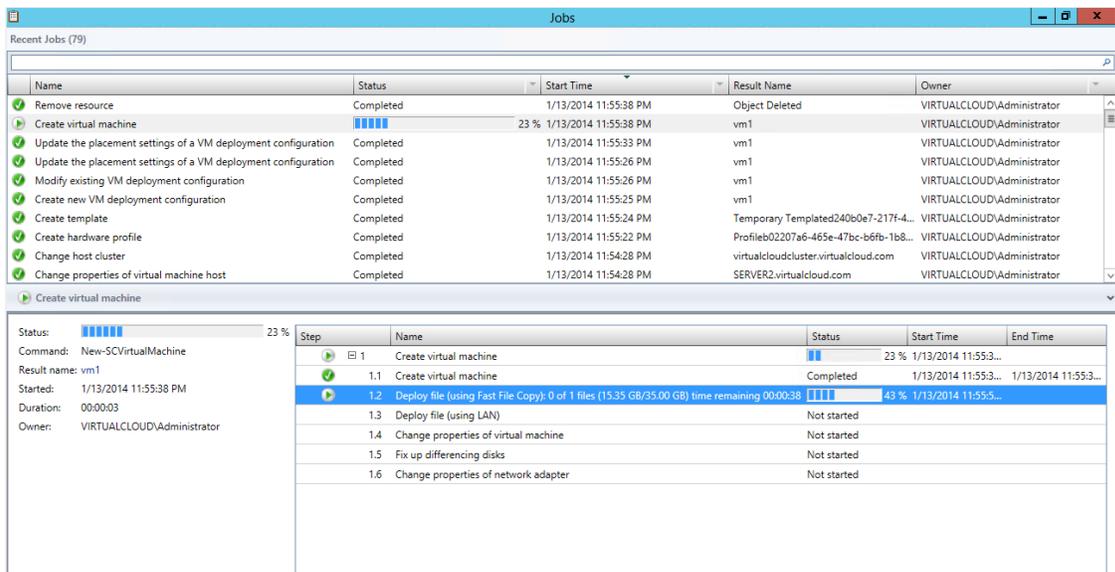
SMB to CSV

This section describes copying files from the SMB share to a LUN on the same FlexVol volume (pool in SCVMM).

This scenario deploys VMs from VHDs placed on an SMB share library to a Hyper-V infrastructure deployed on cluster shared volumes.

The source share and the destination CSV must be on the same volume for faster ODX performance (uses sis-clone engine).

Provision VMs from the VHD residing on the CIFS library share to the Hyper-V CSV. During the provisioning process, the deploy file section is highlighted (using Fast File Copy), which means that ODX-based copy is being used.



10 Scalability and Performance

Data ONTAP SMI-S Agent 5.1 has been validated for the scales listed in Table 3.

Table 3) Scalability measurements.

Parameter	Scale
Windows Server 2012 nodes in a cluster	16 nodes
Virtual machines	100 virtual machines in 45 minutes
SVMs/storage systems	30
LUNs	1,500 per volume

10.1 Troubleshooting SMI-S Provider Issues

You should be familiar with the following Data ONTAP SMI-S Agent 5.1 issues and their causes so that you can solve problems pertaining to consoles, storage controllers, and performance and resource optimization.

Creation of Virtual Machines on NTFS Volumes Only

For SCVMM 2012 SP1 and later, VMs can be created only on file shares created in NTFS volumes. Mixed and UNIX[®] style volumes are not supported. Data ONTAP 8.2 supports only NTFS volumes for VM creation.

VM Creation on Fileshare Received "Access Denied" Error Message

Description

The following error can appear when the CIFS share is not configured properly:

VM Creation on Fileshare Got "Access denied" Error Message

Corrective Action

The system or SVM must be configured properly for the CIFS share. Create the fileshare on the NTFS-only volume.

iSCSI Configuration Issues with VMs Created in Clustered Data ONTAP 8.2

Description

The following error is encountered when there is no dedicated LIF for iSCSI protocol on the SVM:

```
iSCSI Configuration Issues with VMs Created on Clustered Data ONTAP 8.2
```

Corrective Action

NetApp recommends having a dedicated iSCSI LIF on the SVM.

Failed NAS Discovery or Partial Storage Discovery by SCVMM 2012 R2 with Domain User Authentication

Description

The SCVMM cannot discover storage objects if the domain user is used for communication between SMIS and itself.

Corrective Action

NetApp recommends establishing the SCVMM-SMIS communication by creating a CIM server user, which has local administrative rights on the SMI-S Provider. Always add a local user to the SMI-S Provider and use that user to communicate with SCVMM.

Out-of-Band Operations Performed on the Storage Logical Objects Take Time to Reflect in SCVMM

Description

Perform out-of-band operations (such as volume rename, volume resize, and so on) on the storage logical objects, because they are not immediately reflected in SCVMM.

Corrective Action

Wait 5 minutes (the default time) for SMI-S to refresh its cache. Check the value of the `CACHE_REFRESH_SEC` environment variable. The alternative is to re-add the SVM or system to the SMI-S Agent. The customer can also restart the SMI-S Provider, if it is not managing multiple SVMs and not serving any active requests. Perform a rescan in SCVMM to incorporate the changes.

Changing CIFS Share Size Takes Time to Reflect in SCVMM

Description

Changing the size of the volume to accommodate the new capacity of the underlying share is not immediately reflected in SCVMM.

Corrective Action

Instead of changing the size of the volume to accommodate the new capacity of the underlying share, change the quota associated with the qtree where the share is created. Wait 5 minutes (the default time) for the SMI-S Provider to refresh its cache. Perform a rescan in SCVMM to incorporate the changes.

CIFS Server Sometimes Takes a Long Time to Apply the ACLs to the Share

Description

The CIFS Server sometimes takes a long time to apply the ACLs to the share.

Corrective Action

After VMM creates the ACL on the share through SMIS, it tries to access the share on the Hyper-V host. VMM makes multiple retries at intervals of 5 seconds. The CIFS server sometimes takes 30 seconds to a couple of minutes to apply the ACL to the share in Data ONTAP. VMM refreshes the access status to OK at the next interval.

SCVMM 2012 R2 Fails VM Creation on a CIFS Share

SCVMM 2012 R2 Error (20564)

Description

SCVMM fails VM creation on a CIFS share; it is not able to resolve the CIFS server name to its IP address. The base disk paths \\SMISQAVS1_CIFS\vmsharelucky and \\SMISQAVS1_CIFS\odxshare_vm are not present on the host.

Recommended Action

Make sure that all of the selected base disk paths exist and are accessible on the host and then try the operation again.

Corrective Action

Check your domain controller for any stale hostnames that map to the same IP address. Update the hosts file under C:\Windows\system32\driver\etc\ to include the CIFS server name to the IP address mapping.

SCVMM 2012 R2 Error (20411)

Description

```
VMM could not invoke method AssignPrivilegeToExportedShare on
ONTAP_FileExportService.CreationClassName="ONTAP_FileExportService",Name="ONTAP File
ExportService",SystemCreationClassName="ONTAP_StorageSystem",SystemName="ONTAP:bf45eb62-c277-
11e2-bd9f-123478563412" failed with error 80041001 1: CIM_ERR_FAILED: Filer return: Failed to
resolve the security identifier (SID) for the account named "MSSCVMM\vm2012r2rtmvm2$". Reason:
Bad user 'vm2012r2rtmvm2$' or domain 'MSSCVMM'. - With storage system 10.1.136.167.
```

Recommended Action

Make sure that the SMI-S Provider is running and then try the operation again.

Corrective Action

If you encounter the following error in VMM, adjust the clock skew between the SVM and Hyper-V host. It cannot be more than 5 minutes.

```
SCVMM 2012 R2 Error (20411)
```

References

The following references were used in this technical report:

- [TR-3702: NetApp Storage Best Practices for Microsoft Virtualization and NetApp SnapManager for Hyper-V](#)
- [TR-4172: Microsoft Hyper-V over SMB 3.0 with Clustered Data ONTAP: Best Practices](#)
- [Configuring an SMI-S Provider for iSCSI Target Server](#)

- [How to Add and Classify SMI-S and SMP Storage Devices in VMM](#)
- [How to Provision Storage Logical Units in VMM](#)
- [How to Allocate Storage Logical Units to a Host Group in VMM](#)
- [Determine the Hardware Requirements](#)
- [Discovering and Importing Storage Device Information and Assigning Classification](#)
- [Allocating Storage Pools to a Host Group in VMM](#)
- [Creating a Virtual Machine Template](#)
- [Creating and Deploying Virtual Machines Overview](#)
- [Data ONTAP SMI-S Agent 5.1 Installation and Administration Guide](#)
- [Data ONTAP SMI-S Agent 5.1 Release Notes](#)
- [Microsoft System Center Technical Documentation Library](#)
- [Microsoft SCVMM 2012 Technical Documentation Library](#)

When basic troubleshooting does not resolve an issue with Microsoft, use one of the many support features available to NetApp customers.

- [NetApp Community](#)
- [NetApp Support Community](#)

Version History

Version	Date	Document Version History
Version 1.0	February 2014	Initial release

Refer to the [Interoperability Matrix Tool \(IMT\)](#) on the NetApp Support site to validate that the exact product and feature versions described in this document are supported for your specific environment. The NetApp IMT defines the product components and versions that can be used to construct configurations that are supported by NetApp. Specific results depend on each customer's installation in accordance with published specifications.

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