

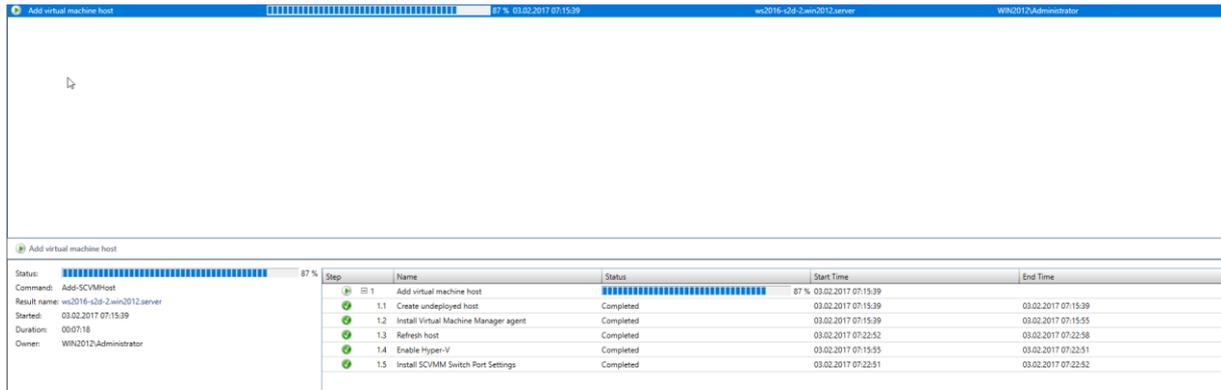
# Storage Spaces Direct mit System Center Virtual Machine Manager 2016

Vorbereitung:

Zwei VM mit Windows Server 2016 Datacenter, voll gepatcht und jeweils 7 VHDX fuer den Speicher. Voraussetzungen fuer Windows 10 Nested Virtualization beachten:

<https://docs.microsoft.com/en-us/virtualization/hyper-v-on-windows/user-guide/nested-virtualization>

Die beiden Server unter VMM Verwaltung bringen

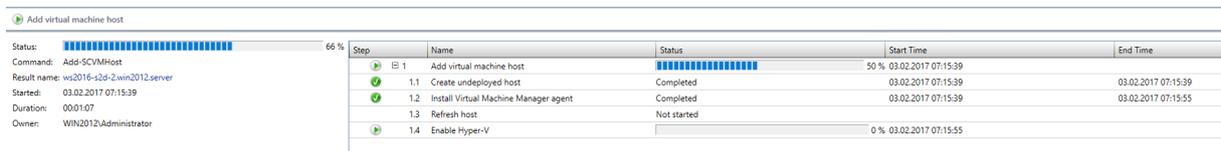


Step	Name	Status	Start Time	End Time
1	Add virtual machine host	87 %	03.02.2017 07:15:39	
1.1	Create undeployed host	Completed	03.02.2017 07:15:39	03.02.2017 07:15:39
1.2	Install Virtual Machine Manager agent	Completed	03.02.2017 07:15:39	03.02.2017 07:15:55
1.3	Refresh host	Completed	03.02.2017 07:22:52	03.02.2017 07:22:58
1.4	Enable Hyper-V	Completed	03.02.2017 07:15:55	03.02.2017 07:22:51
1.5	Install SCVMM Switch Port Settings	Completed	03.02.2017 07:22:51	03.02.2017 07:22:52

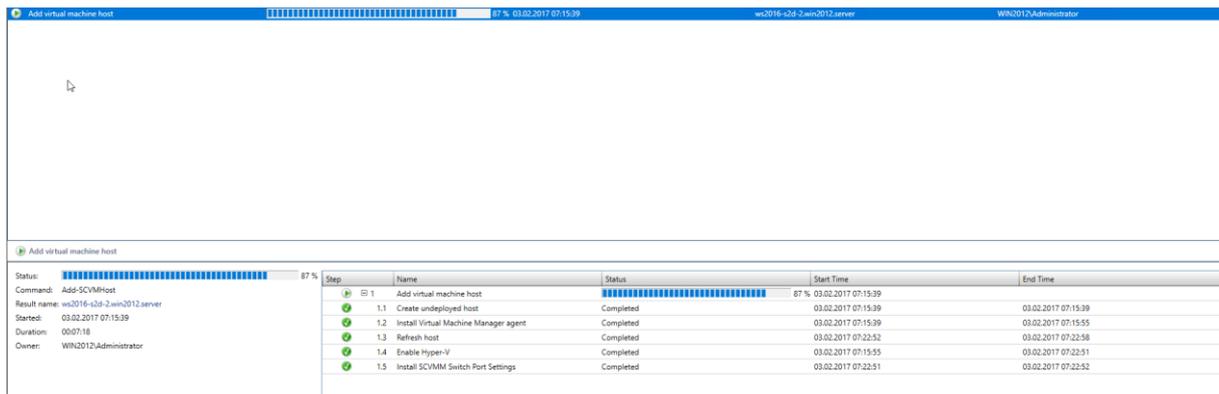
Dauert ein wenig. Hyper-V Rolle wird ebenfalls aktiviert.



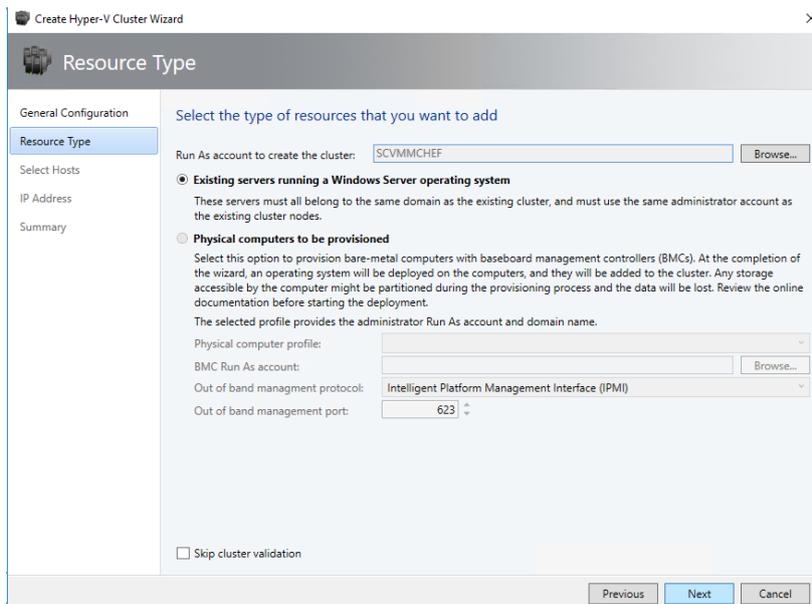
Name	Status	Start Time	Result Name	Owner
Add virtual machine host	66 %	03.02.2017 07:15:40	ws2016-s2d-1.win2012.server	WIN2012\Administrator
Add virtual machine host	66 %	03.02.2017 07:15:39	ws2016-s2d-2.win2012.server	WIN2012\Administrator



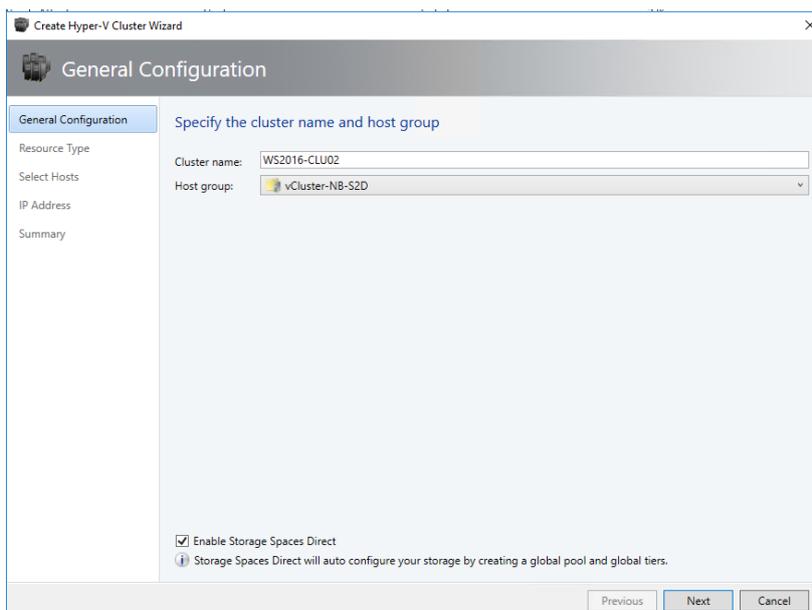
Step	Name	Status	Start Time	End Time
1	Add virtual machine host	66 %	03.02.2017 07:15:39	
1.1	Create undeployed host	Completed	03.02.2017 07:15:39	03.02.2017 07:15:39
1.2	Install Virtual Machine Manager agent	Completed	03.02.2017 07:15:39	03.02.2017 07:15:55
1.3	Refresh host	Not started		
1.4	Enable Hyper-V	0 %	03.02.2017 07:15:55	



## Danach einen Hyper-V Cluster erstellen



## Clusternamen vergeben



## Hosts zum Cluster hinzufuegen

Create Hyper-V Cluster Wizard

### Select Hosts

General Configuration

Resource Type

Select Hosts

IP Address

Summary

Select the hosts to include in the cluster

The following list shows hosts that are not already clustered and are in the host group you selected on the General Configuration page.

Available hosts:

<input checked="" type="checkbox"/> Host	Operating System
<input checked="" type="checkbox"/> ws2016-s2d-2	Microsoft Windows Server 2016 Datacenter
<input checked="" type="checkbox"/> ws2016-s2d-1	Microsoft Windows Server 2016 Datacenter

Select all

Previous Next Cancel

## Cluster IP-Adresse vergeben

Create Hyper-V Cluster Wizard

### IP Address

General Configuration

Resource Type

Select Hosts

IP Address

Summary

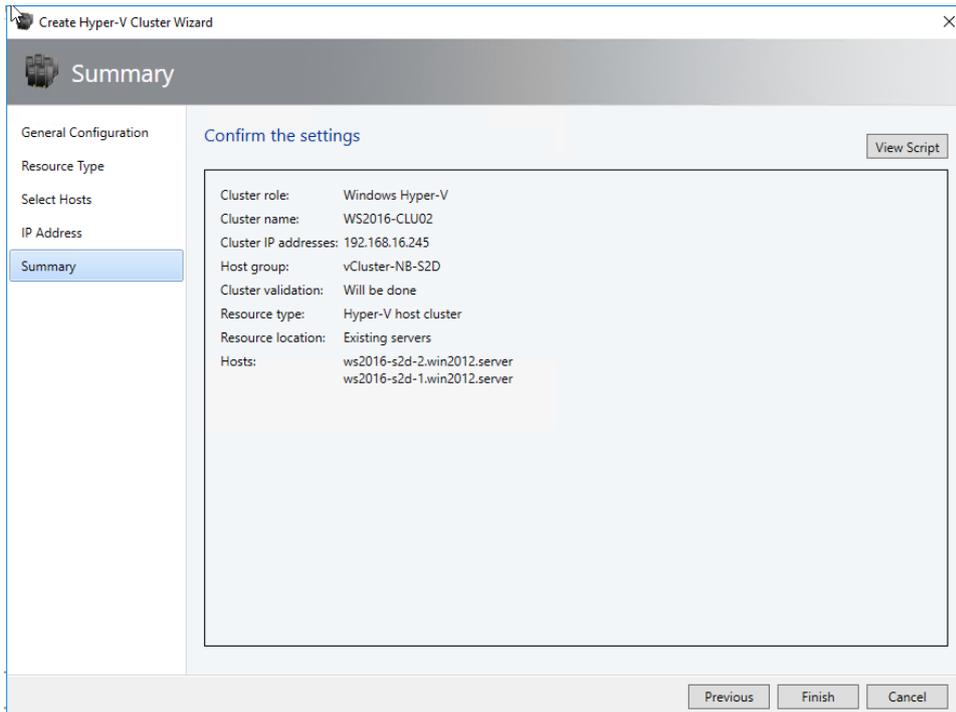
Enter any static IP addresses needed by the cluster

If the cluster you are creating needs a static IP address on one or more networks, select the network and either type in a static IP address or select a static IP address pool.

Network	Static IP Pool	IP Address
<input checked="" type="checkbox"/> 192.168.16.0/24		192.168.16.245

Previous Next Cancel

# Einstellungen pruefen



# Es geht los

Name	Status	Start Time	Result Name	Owner
Install cluster	0 %	03.02.2017 07:26:57	WS2016-CLU02.win2012.server	WIN2012\Administrator
Add virtual machine host	Completed w/ Info	03.02.2017 07:15:40	ws2016-s2d-1.win2012.server	WIN2012\Administrator
Add virtual machine host	Completed w/ Info	03.02.2017 07:15:39	ws2016-s2d-2.win2012.server	WIN2012\Administrator

Install cluster

up: 0 %

vmcmd: Install-SCVMSHostCluster

Jit name: WS2016-CLU02.win2012.server

ted: 03.02.2017 07:26:57

stion: 000003

ver: WIN2012\Administrator

Step	Name	Status	Start Time	End Time
1	Install cluster	0 %	03.02.2017 07:26:57	
1.1	Install Features	0 %	03.02.2017 07:26:58	
1.1.1	Install Failover Cluster Feature	0 %	03.02.2017 07:26:58	
1.1.2	Install Failover Cluster Feature	Not started		
1.2	Parallel execution step	Not started		
1.3	Validate nodes for clustering	Not started		
1.4	Create cluster	Not started		
1.5	Refresh host cluster	Not started		
1.6	Wait for DNS record to update for network name WS201...	Not started		
1.7	Enable DAS mode on cluster : WS2016-CLU02	Not started		
1.8	Discover and refresh storage	Not started		

## Dauert ein wenig

Install cluster

95 % 03.02.2017 07:26:57

WS2016-CLU02-win2012.server WIN2012\Administrator

WS2016-s2d-1.win2012.server WIN2012\Administrator

WS2016-s2d-2.win2012.server WIN2012\Administrator

---

Install cluster

Status: 95 %

Command: Install-SCVMHostCluster

Result name: WS2016-CLU02-win2012.server

Started: 03.02.2017 07:26:57

Duration: 00:00:03

Owner: WIN2012\Administrator

Step	Name	Status	Start Time	End Time
IS 1	Install cluster	Completed	03.02.2017 07:26:57	
1.1.1	Install Features	Completed	03.02.2017 07:26:58	03.02.2017 07:28:09
1.1.2	Install Failover Cluster Feature	Completed	03.02.2017 07:26:58	03.02.2017 07:27:53
1.1.2	Install Failover Cluster Feature	Completed	03.02.2017 07:27:53	03.02.2017 07:28:09
1.2	Parallel execution step	Completed	03.02.2017 07:28:09	03.02.2017 07:32:06
1.3	Validate nodes for clustering	Completed	03.02.2017 07:32:06	03.02.2017 07:33:26
1.4	Create cluster	Completed	03.02.2017 07:33:26	03.02.2017 07:34:04
1.5	Refresh host cluster	Completed	03.02.2017 07:34:04	03.02.2017 07:34:19
1.6	Wait for DNS record to update for network name WS201...	Completed	03.02.2017 07:34:19	03.02.2017 07:34:20
1.7	Enable DAS mode on cluster   WS2016-CLU02	Completed	03.02.2017 07:34:23	03.02.2017 07:36:03
1.8	Discover and refresh storage	Completed	03.02.2017 07:36:03	

## Fertig. Clustervalidierungs-Ergebnisse prüfen

Install cluster

Completed w/ info 03.02.2017 07:26:57

WS2016-CLU02-win2012.server WIN2012\Administrator

WS2016-s2d-1.win2012.server WIN2012\Administrator

WS2016-s2d-2.win2012.server WIN2012\Administrator

---

Install cluster

Status: Completed w/ info

Command: Install-SCVMHostCluster

Result name: WS2016-CLU02-win2012.server

Started: 03.02.2017 07:26:57

Duration: 00:00:15

Owner: WIN2012\Administrator

**Warning (25323)**

Cluster validation reported some warnings. Refer to 'Validation Report\_2017.02.03\_Ar\_07.32.24.htm' in '%windir%\Cluster\Reports' of any node for further information on the warnings.

**Recommended Action**

Refer to the cluster documentation for fixing the issue reported in the file for cluster to function properly.

## Cluster Storage Pool wurde angelegt

Pools (1)

Search

Name	Status	Health Status	Owner Node	Operational Status	Free Space	Used Space	Capacity	Information
Cluster Pool 1	Online	Healthy	WS2016-S2D-2	OK	102 GB	3,00 GB	105 GB	

---

Cluster Pool 1

**Status:** Online

**Pool Id:** 302f34e6-86e0-4fc-b14a-d829e3aad2ff

**Pool Name:** S2D on WS2016-CLU02

**Pool Description:** Reserved for S2D

**Physical Disk Number(s):** 5008, 5005, 5000, 5002, 5004, 5001, 5007, 5012, 5011, 5009, 5010, 5003

**Health Status:** Healthy

**Operational Status:** OK

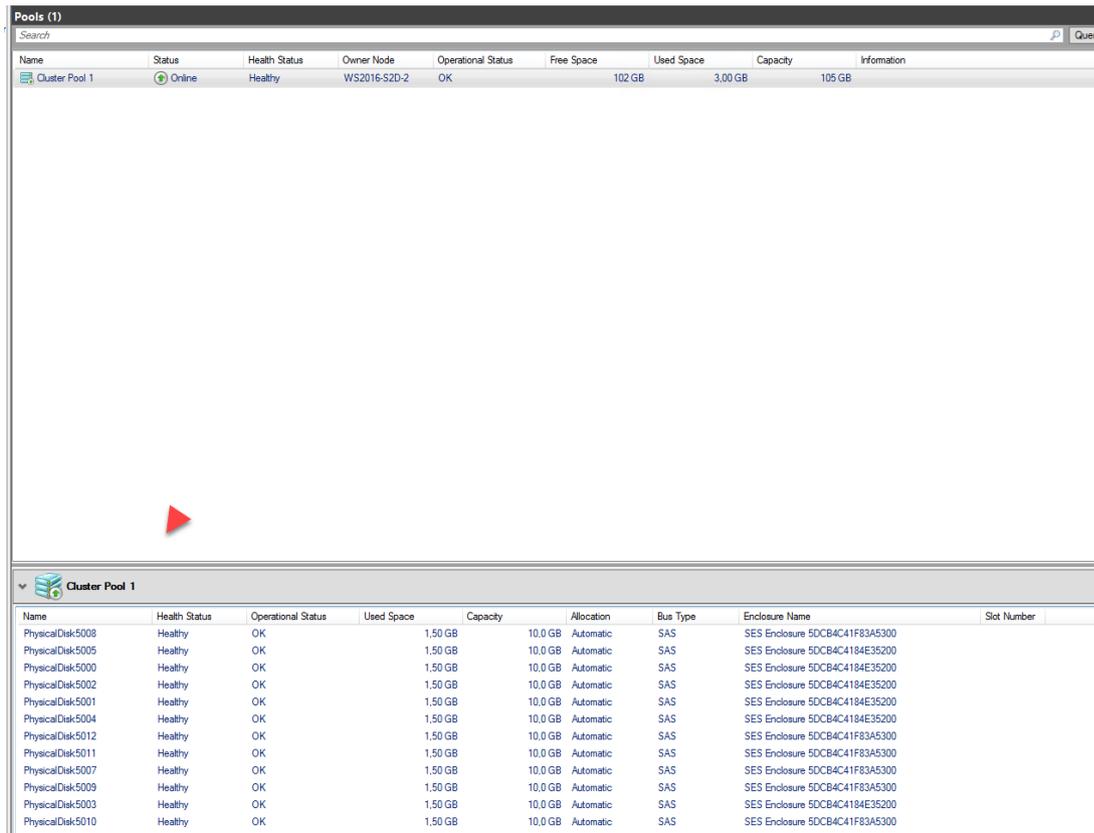
**Free Space:** 102 GB

**Used Space:** 3,00 GB

**Capacity:** 105 GB

**Owner Node:** WS2016-S2D-2

## Festplatten tauchen auf



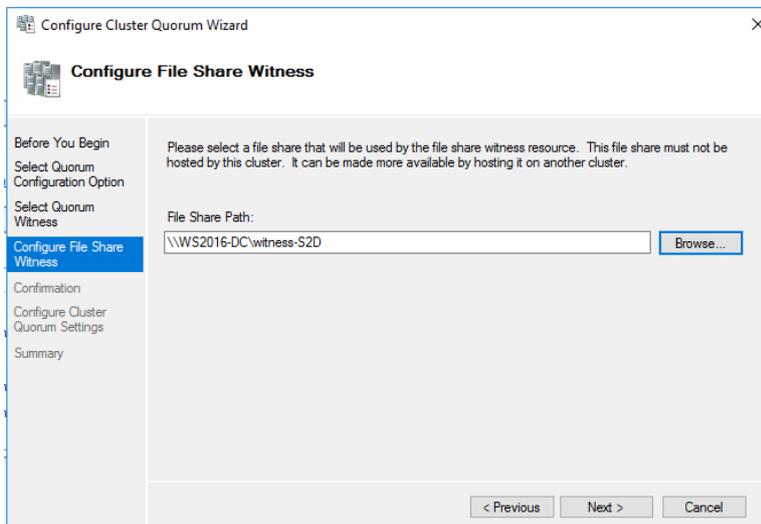
The screenshot shows the VMM Pools (1) console. At the top, there is a search bar and a 'Quorum' button. Below is a table with columns: Name, Status, Health Status, Owner Node, Operational Status, Free Space, Used Space, Capacity, and Information. The table contains one entry: Cluster Pool 1, which is Online, Healthy, owned by WS2016-S2D-2, and has 102 GB Free Space, 3.00 GB Used Space, and a Capacity of 105 GB. Below this table, there is a red arrow pointing to the 'Cluster Pool 1' section. Underneath, there is a detailed table for Cluster Pool 1 with columns: Name, Health Status, Operational Status, Used Space, Capacity, Allocation, Bus Type, Enclosure Name, and Slot Number. This table lists 14 PhysicalDisk entries, all with a Health Status of 'Healthy' and an Operational Status of 'OK'. Each disk has a capacity of 1.50 GB and is allocated 10.0 GB. The bus type is 'Automatic' and the enclosure name is 'SES Enclosure 5DCB4C41F83A5300'.

Name	Status	Health Status	Owner Node	Operational Status	Free Space	Used Space	Capacity	Information
Cluster Pool 1	Online	Healthy	WS2016-S2D-2	OK	102 GB	3.00 GB	105 GB	

Name	Health Status	Operational Status	Used Space	Capacity	Allocation	Bus Type	Enclosure Name	Slot Number
PhysicalDisk:5008	Healthy	OK	1,50 GB	1,50 GB	10,0 GB	Automatic	SAS	SES Enclosure 5DCB4C41F83A5300
PhysicalDisk:5005	Healthy	OK	1,50 GB	1,50 GB	10,0 GB	Automatic	SAS	SES Enclosure 5DCB4C4184E35200
PhysicalDisk:5000	Healthy	OK	1,50 GB	1,50 GB	10,0 GB	Automatic	SAS	SES Enclosure 5DCB4C4184E35200
PhysicalDisk:5002	Healthy	OK	1,50 GB	1,50 GB	10,0 GB	Automatic	SAS	SES Enclosure 5DCB4C4184E35200
PhysicalDisk:5001	Healthy	OK	1,50 GB	1,50 GB	10,0 GB	Automatic	SAS	SES Enclosure 5DCB4C4184E35200
PhysicalDisk:5004	Healthy	OK	1,50 GB	1,50 GB	10,0 GB	Automatic	SAS	SES Enclosure 5DCB4C4184E35200
PhysicalDisk:5012	Healthy	OK	1,50 GB	1,50 GB	10,0 GB	Automatic	SAS	SES Enclosure 5DCB4C41F83A5300
PhysicalDisk:5011	Healthy	OK	1,50 GB	1,50 GB	10,0 GB	Automatic	SAS	SES Enclosure 5DCB4C41F83A5300
PhysicalDisk:5007	Healthy	OK	1,50 GB	1,50 GB	10,0 GB	Automatic	SAS	SES Enclosure 5DCB4C41F83A5300
PhysicalDisk:5009	Healthy	OK	1,50 GB	1,50 GB	10,0 GB	Automatic	SAS	SES Enclosure 5DCB4C41F83A5300
PhysicalDisk:5003	Healthy	OK	1,50 GB	1,50 GB	10,0 GB	Automatic	SAS	SES Enclosure 5DCB4C4184E35200
PhysicalDisk:5010	Healthy	OK	1,50 GB	1,50 GB	10,0 GB	Automatic	SAS	SES Enclosure 5DCB4C41F83A5300

## Cluster Quorum konfigurieren



The screenshot shows the 'Configure Cluster Quorum Wizard' dialog box. The title bar reads 'Configure Cluster Quorum Wizard'. The main title is 'Configure File Share Witness'. Below the title, there is a message: 'Please select a file share that will be used by the file share witness resource. This file share must not be hosted by this cluster. It can be made more available by hosting it on another cluster.' On the left side, there is a navigation pane with the following steps: 'Before You Begin', 'Select Quorum Configuration Option', 'Select Quorum Witness', 'Configure File Share Witness' (which is currently selected), 'Confirmation', 'Configure Cluster Quorum Settings', and 'Summary'. In the main area, there is a 'File Share Path:' label followed by a text box containing '\\WS2016-DC:witness-S2D' and a 'Browse...' button. At the bottom, there are three buttons: '< Previous', 'Next >', and 'Cancel'.

Netzwerkkarten konfigurieren und allgemeine Cluster-Einstellungen

Cluster taucht als Storage Array im VMM auf.

Name	Total Capacity	Used Capacity	Pools	Provider Name	Status
WS2016-CLU02.win2012.server	105,00 GB		3,00 GB 1 (1 managed)	WS2016-CLU02.win2012.server	Responding

WS2016-CLU02.win2012.server Properties

**General page**

Name: WS2016-CLU02.win2012.server

Description:

Provider: WS2016-CLU02.win2012.server

Serial number: {60339485-89d8-451d-98a3-5749638d5999}

Manufacturer: Microsoft Corporation

Model: Clustered Windows Storage

Firmware version: 10.0.2

Storage pools associated with classification

Total capacity: 105,00 GB

Allocated capacity: 0 GB

Available capacity: 102,00 GB

Storage pools: 1 (1 managed)

View Script OK Cancel

WS2016-CLU02.win2012.server

**Array information**

Status: Responding

Last refresh: 03.02.2017 07:36:12

Manufacturer: Microsoft Corporation

Model: Clustered Windows Storage

Pools: S2D on WS2016-CLU02

**Capacity information**

Total capacity: 105,00 GB

Allocated capacity: 0 GB

In use capacity: 3,00 GB

Capacity usage:

**Logical unit information**

Provisioned: 0

Assigned: 0

Unassigned: 0

Logical units per array:

## Einstellungen

WS2016-CLU02.win2012.server Properties

**Settings**

**Storage array settings**

Select the method that you want to use to create new storage capacity when you use rapid provisioning to deploy new virtual machines.

Use snapshots

Use this method 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.

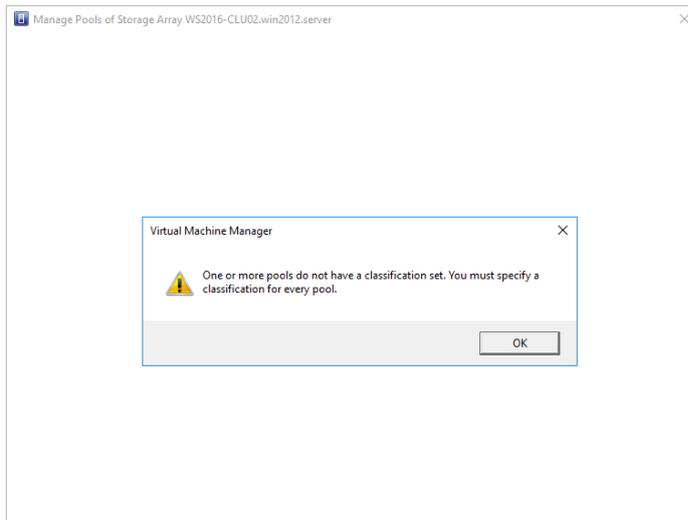
Clone logical units

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.

IOPS size (KB): 8

View Script OK Cancel

## Storage Klassifizierung festlegen



Name	Type	Size	Available Capacity	Assigned	Description
S2D	Classification	105,00 GB	102,00 GB		
S2D on WS2016-CLU02	Storage pool	105,00 GB	102,00 GB		S2D on WS2016-CLU02

Festplatten Typ spezifizieren. In der Regel nur notwendig bei virtualisierten Clustern / Storage

```

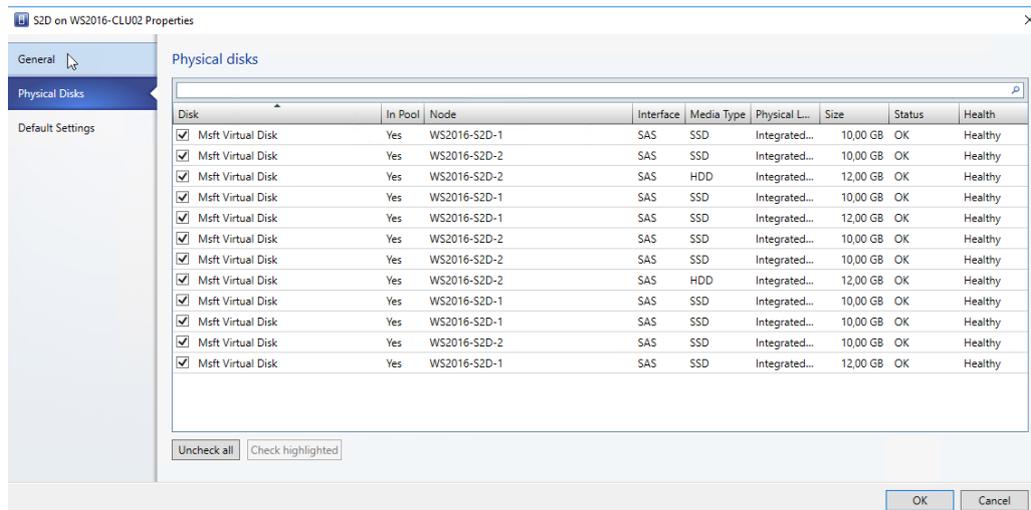
Administrator: Windows PowerShell
Windows PowerShell
Copyright (C) 2016 Microsoft Corporation. All rights reserved.

PS C:\Users\administrator.WIN2012> Get-StorageSubsystem *cluster*

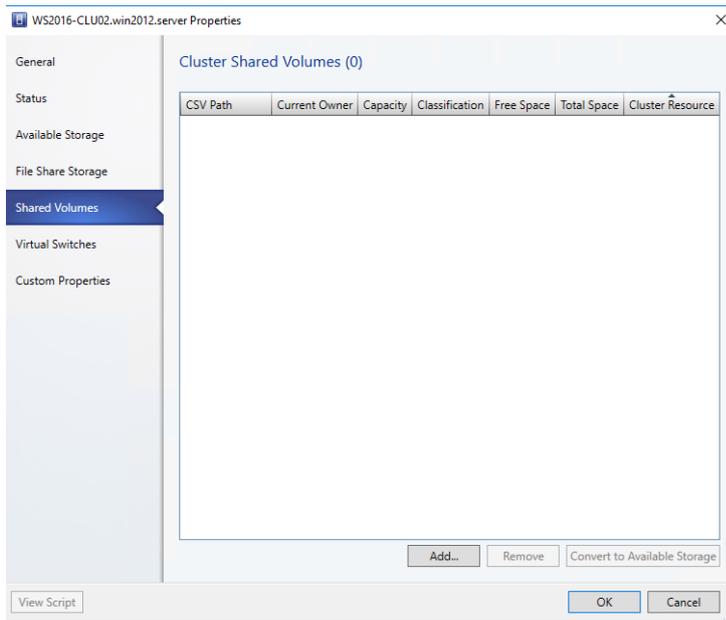
FriendlyName          HealthStatus OperationalStatus
-----
Clustered Windows Storage on WS2016-CLU02 Warning      OK

PS C:\Users\administrator.WIN2012> Get-StorageSubsystem *cluster* | Get-PhysicalDisk | Where MediaType -eq "Unspecified"
Set-PhysicalDisk -MediaType HDD
PS C:\Users\administrator.WIN2012>
    
```

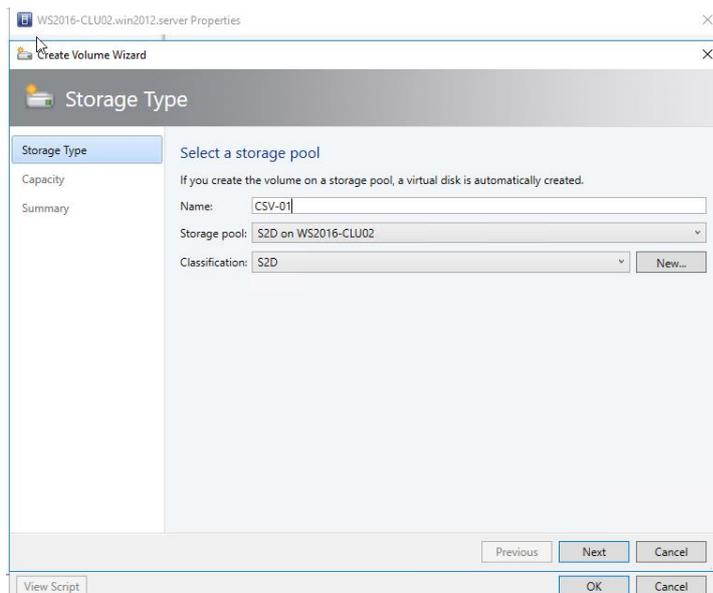
SSD geht auch

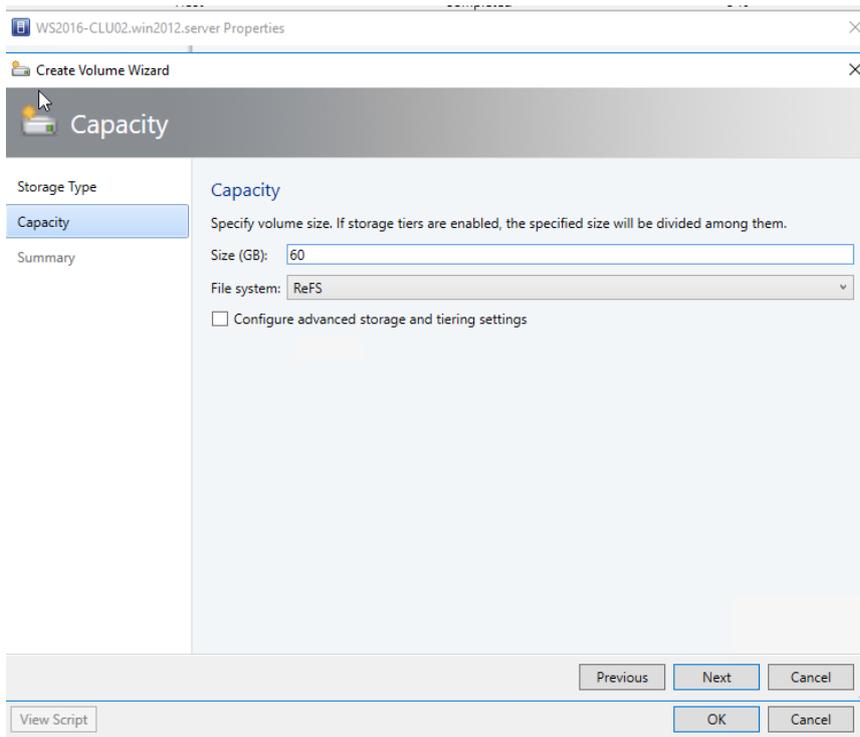


## Noch kein CSV vorhanden



## CSV anlegen





Es geht los

Icon	Operation	Status	Time	Path	User
✓	Creates a new Volume	Completed	03.02.2017 09:02:52	C:\ClusterStorage\Volume1\	WIN2012\Administrator
✗	Creates a new Volume	Failed	03.02.2017 09:02:24	Job Failed	WIN2012\Administrator
✓	Refresh host cluster	Completed	03.02.2017 09:00:03	ws2016-s2d-1.win2012.server	WIN2012\Administrator
⚠	Refresh host cluster	Completed w/ Info	03.02.2017 08:58:43	WS2016-CLU01.win2012.server	WIN2012\SCVMMAdmin
⚠	Refresh host cluster	Completed w/ Info	03.02.2017 08:52:52	WS2016-CLU2.win2012.server	WIN2012\SCVMMAdmin
✓	Sets Storage Array	Completed	03.02.2017 08:50:01	WS2016-CLU02.win2012.server	WIN2012\Administrator
✓	Creates new Storage Classification	Completed	03.02.2017 08:49:56	S2D	WIN2012\Administrator
✓	Reads Storage Provider	Completed	03.02.2017 08:48:43	WS2016-CLU02.win2012.server	WIN2012\Administrator
✓	Discover Cluster Node Up	Completed	03.02.2017 08:44:38	ws2016-s2d-2.win2012.server	WIN2012\SCVMMAdmin
✓	Discover Cluster Node Down	Completed	03.02.2017 08:44:26	ws2016-s2d-2.win2012.server	WIN2012\SCVMMAdmin
✓	Discover Cluster Node Down	Completed	03.02.2017 08:44:00	ws2016-s2d-1.win2012.server	WIN2012\SCVMMAdmin
✓	Refresh host cluster	Completed	03.02.2017 08:34:51	WS2016-CLU02.win2012.server	WIN2012\SCVMMAdmin
⚠	Refresh host cluster	Completed w/ Info	03.02.2017 08:28:43	WS2016-CLU01.win2012.server	WIN2012\SCVMMAdmin

Property	Previous Value	New Value
Status:	Completed	
Command:	New-SCStorageVolume	
Result name:	C:\ClusterStorage\Volume1\	
Started:	03.02.2017 09:02:52	
Duration:	00:00:16	
Owner:	WIN2012\Administrator	

## Storage Management im Server Manager

Server Manager • File and Storage Services • Volumes • Storage Pools

STORAGE POOLS

Name	Type	Managed by	Available to	Read-Write Server	Capacity	Free Space	Percent Allocated	Status
Clustered Windows Storage (1)								
S2D on WS2016-CLU02	Storage Pool	WS2016-CLU02	WS2016-CLU02	WS2016-S2D-1	105 GB	77.5 GB		

VIRTUAL DISKS

Name	Status	Layout	Provisioning	Capacity	Allocated	Volume	Clustered	Tiered	Write-Back Cache	Attached
CVY-01	Minor	Fixed		12.0 GB	12.0 GB					WS2016-S2D-1

PHYSICAL DISKS

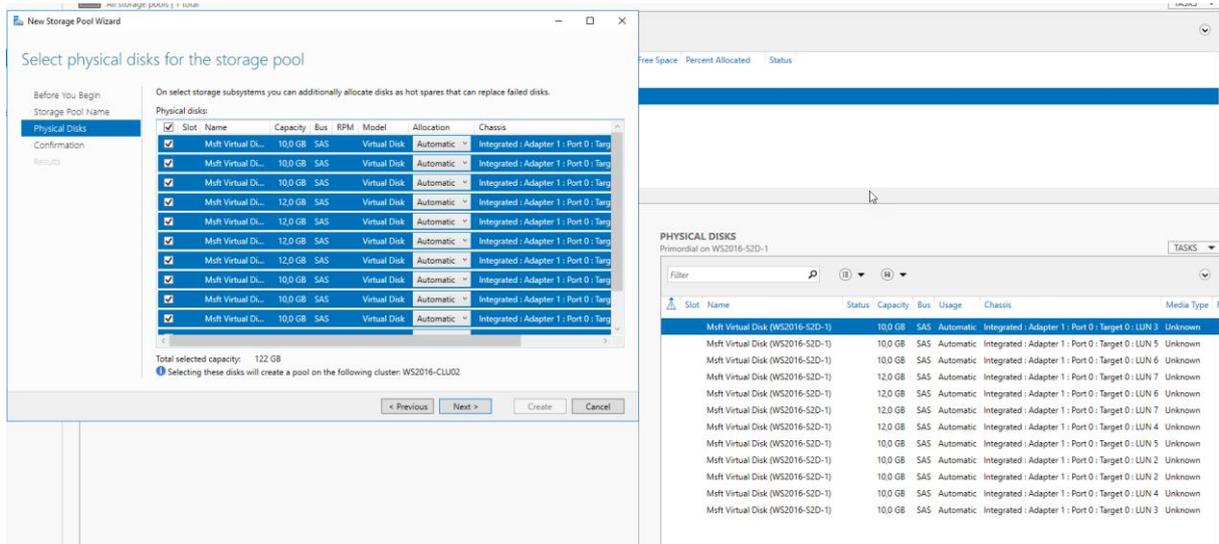
Slot	Name	Status	Capacity	Bus	Usage	Chassis	Media Type
	Mft Virtual Disk (WS2016-S2D-1)	10.0 GB	SAS	Automatic	Integrated - Adapter 1 - Port 0 - Target 0 - LUN 3	SSD	
	Mft Virtual Disk (WS2016-S2D-1)	10.0 GB	SAS	Automatic	Integrated - Adapter 1 - Port 0 - Target 0 - LUN 4	SSD	
	Mft Virtual Disk (WS2016-S2D-1)	10.0 GB	SAS	Automatic	Integrated - Adapter 1 - Port 0 - Target 0 - LUN 3	SSD	
	Mft Virtual Disk (WS2016-S2D-1)	12.0 GB	SAS	Automatic	Integrated - Adapter 1 - Port 0 - Target 0 - LUN 7	SSD	
	Mft Virtual Disk (WS2016-S2D-1)	10.0 GB	SAS	Automatic	Integrated - Adapter 1 - Port 0 - Target 0 - LUN 2	SSD	
	Mft Virtual Disk (WS2016-S2D-1)	10.0 GB	SAS	Automatic	Integrated - Adapter 1 - Port 0 - Target 0 - LUN 5	SSD	
	Mft Virtual Disk (WS2016-S2D-1)	10.0 GB	SAS	Automatic	Integrated - Adapter 1 - Port 0 - Target 0 - LUN 2	SSD	
	Mft Virtual Disk (WS2016-S2D-1)	12.0 GB	SAS	Automatic	Integrated - Adapter 1 - Port 0 - Target 0 - LUN 7	HDD	
	Mft Virtual Disk (WS2016-S2D-1)	10.0 GB	SAS	Automatic	Integrated - Adapter 1 - Port 0 - Target 0 - LUN 6	HDD	
	Mft Virtual Disk (WS2016-S2D-1)	12.0 GB	SAS	Automatic	Integrated - Adapter 1 - Port 0 - Target 0 - LUN 4	HDD	
	Mft Virtual Disk (WS2016-S2D-1)	10.0 GB	SAS	Automatic	Integrated - Adapter 1 - Port 0 - Target 0 - LUN 5	SSD	
	Mft Virtual Disk (WS2016-S2D-1)	12.0 GB	SAS	Automatic	Integrated - Adapter 1 - Port 0 - Target 0 - LUN 6	SSD	

Delete Virtual Disk

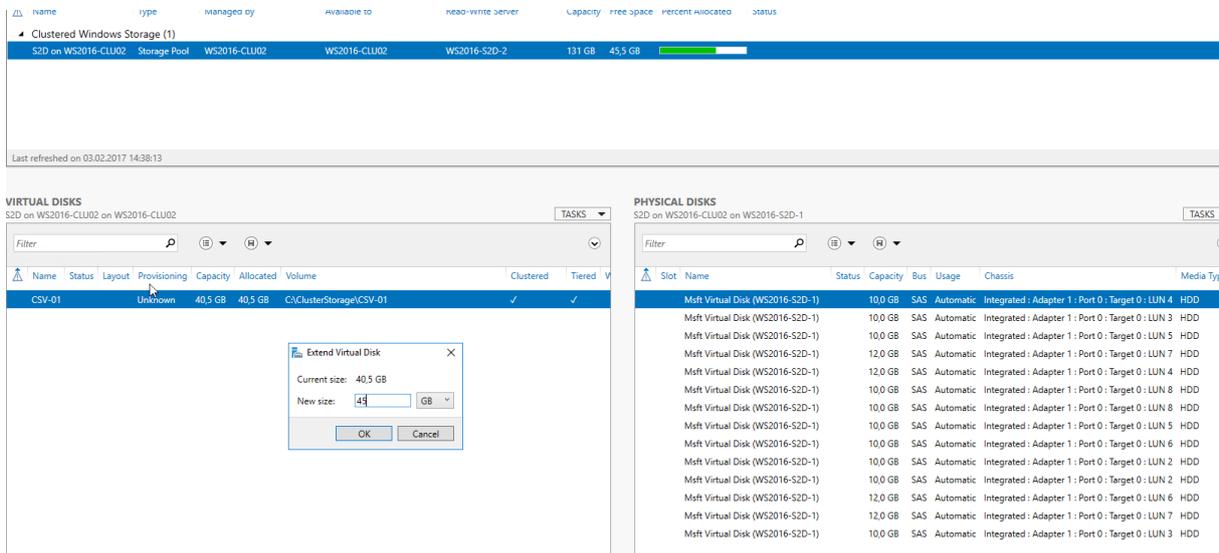
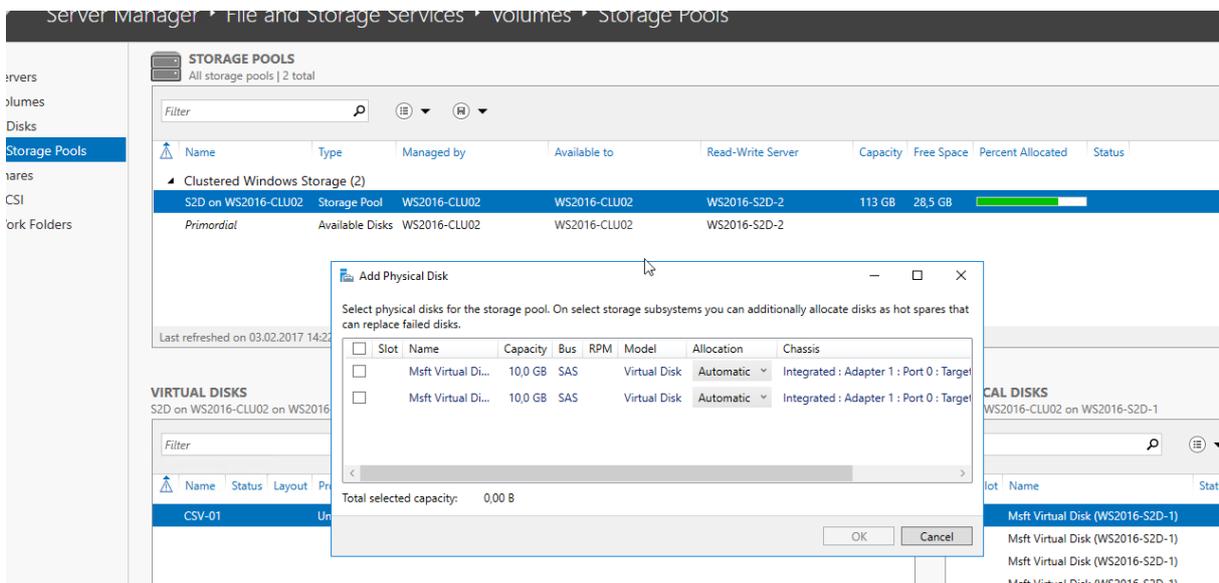
Deleting this virtual disk erases all data on it. Back up any data that you want to keep before deleting the disk. Do you want to continue?

Yes No

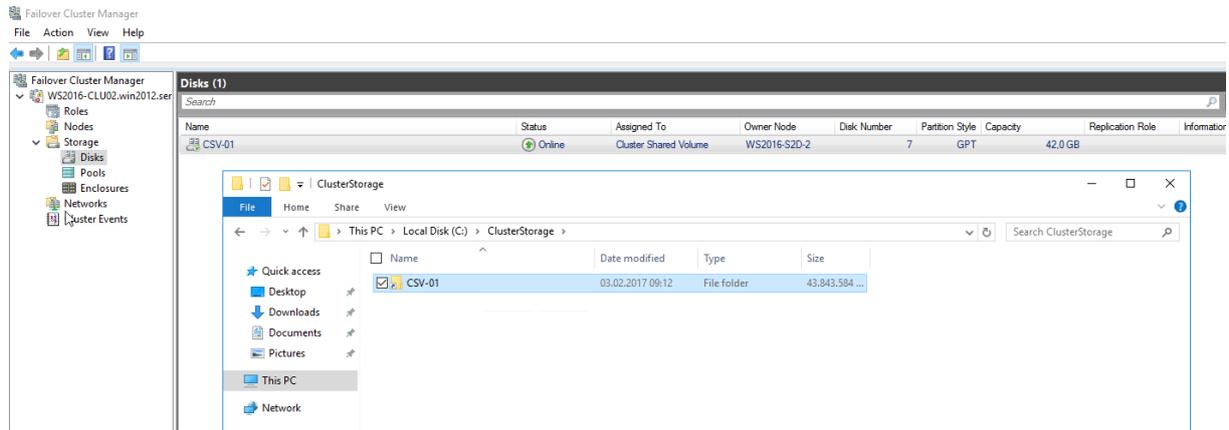
# Manuell



# Zusaetzliche Disken



# CSV im Failover Cluster



# Neue VM erstellen

Name	Status	Start Time	Result Name	Owner
Remove resource	Completed	03.02.2017 09:14:24	Object Deleted	WIN2012\Administrator
Create virtual machine	21 %	03.02.2017 09:14:23	WS2016-MEMBER6	WIN2012\Administrator
Update the placement settings of a VM deployment configuration	Completed	03.02.2017 09:14:11	WS2016-MEMBER6	WIN2012\Administrator
Modify existing VM deployment configuration	Completed	03.02.2017 09:14:11	WS2016-MEMBER6	WIN2012\Administrator
Update the placement settings of a VM deployment configuration	Completed	03.02.2017 09:13:52	WS2016-MEMBER6	WIN2012\Administrator
Modify existing VM deployment configuration	Completed	03.02.2017 09:13:52	WS2016-MEMBER6	WIN2012\Administrator
Create new VM deployment configuration	Completed	03.02.2017 09:13:46	WS2016-MEMBER6	WIN2012\Administrator
Create template	Completed	03.02.2017 09:13:45	Temporary Template42ea4ec-ca56-4696-a40d-a34e738e0b85	WIN2012\Administrator
Create hardware profile	Completed	03.02.2017 09:13:36	Profile306f25d4-41a0-4474-b460-6b431d13aa9b	WIN2012\Administrator
Creates a new Volume	Completed	03.02.2017 09:11:59	C:\ClusterStorage\Volume1\	WIN2012\Administrator
Refresh host cluster	Completed	03.02.2017 09:11:18	WS2016-CLU02.win2012.server	WIN2012\Administrator
Reads Storage Provider	Completed	03.02.2017 09:07:22	WS2016-CLU02.win2012.server	WIN2012\Administrator
Creates a new Volume	Failed	03.02.2017 09:07:09	Job Failed	WIN2012\Administrator

Step	Name	Status	Start Time	End Time
1	Create virtual machine	21 %	03.02.2017 09:14:23	
1.1	Create virtual machine	Completed	03.02.2017 09:14:25	03.02.2017 09:14:26
1.2	Deploy file (using Fast File Copy) 0 of 1 files (4.65 GB/9.36 GB) time remaining 00:00:14	49 %	03.02.2017 09:14:26	
1.3	Deploy file (using LAN)	Not started		
1.4	Change properties of virtual machine	Not started		
1.5	Fix up differencing disks	Not started		
1.6	Change properties of network adapter	Not started		
1.7	Start virtual machine for customization	Not started		