Storage Space Direct using as quorum in FC

Storage Spaces Direct uses industry-standard servers with local-attached drives to create highly available, highly scalable software-defined storage at a fraction of the cost of traditional SAN or NAS arrays. Its converged or hyper-converged architecture radically simplifies procurement and deployment, while features such as caching, storage tiers, and erasure coding, together with the latest hardware innovations such as RDMA networking and NVMe drives, deliver unrivaled efficiency and performance.

Test-cluster -node fctest1, fctest2 -Include "Storage Spaces Direct",Inventory,Network,"System Configuration"


```
PS                    I> winver.exe
PS                    I>
```

About Windows   ✕

Windows Server® 2019

Microsoft Windows Server
Version 1809 (OS Build 17763.316)
© 2018 Microsoft Corporation. All rights reserved.

The Windows Server 2019 Datacenter operating system and its user interface are protected by trademark and other pending or existing intellectual property rights in the United States and other countries/regions.

This product is licensed under the Microsoft Software License Terms to:

    user name
    org name

                                                        OK

```
            › Test-cluster -node rg2019 -Include "Storage Spaces Direct",Inventory,Network,"System Configuration
WARNING: System Configuration - Validate Active Directory Configuration: The test reported some warnings..
WARNING: Storage Spaces Direct - Verify Node and Disk Configuration: The test reported some warnings..
WARNING:
Test Result:
ClusterConditionallyApproved
Testing has completed successfully. The configuration appears to be suitable for clustering.  However, you should
review the report because it may contain warnings which you should address to attain the highest availability.
Test report file path: C:\Users\genadmin\AppData\Local\Temp\2\Validation Report 2019.03.09 At 13.41.50.htm

Mode            LastWriteTime        Length Name
----            -------------        ------ ----
-a----        3/9/2019   1:42 PM     381086 Validation Report 2019.03.09 At 13.41.50.htm
```

```
     ı> Enable-ClusterStorageSpacesDirect
WARNING: 2019/03/09-13:49:29.906 Node rg2019: Disks not claimed - bb244ecf-4270-11e9-acf4-806e6f6e6963

Confirm
Are you sure you want to perform this action?
Performing operation 'Enable Cluster Storage Spaces Direct' on Target 'FC2019'.
[Y] Yes  [A] Yes to All  [N] No  [L] No to All  [S] Suspend  [?] Help (default is "Y"): y
```

Enable-ClusterStorageSpacesDirect

Note : For this required at least 3 disk needed

Data disks

LUN	NAME	SIZE	STORAGE ACCOUNT TYPE
0	rg2019_DataDisk_0	100 GiB	Standard SSD
1	rg2019_DataDisk_1	100 GiB	Standard SSD
2	rg2019_DataDisk_2	100 GiB	Standard SSD

New Storage Pool Wizard — □ ×

ions
ols

Add Storage Pool

New Storage Pool

View

Refresh

Help

Select physical disks for the storage pool

Before You Begin
Storage Pool Name
Physical Disks
Confirmation
Results

On select storage subsystems you can additionally allocate disks as hot spares that can replace failed disks.

Physical disks:

☑	Slot	Name	Capacity	Bus	RPM	Model	Allocation	Chassis
☑		Msft Virtual Di...	100 GB	SAS		Virtual Disk	Automatic ˅	Integrated : Adapter 4 : Port 0 : Target (
☑		Msft Virtual Di...	100 GB	SAS		Virtual Disk	Automatic ˅	Integrated : Adapter 4 : Port 0 : Target (
☑		Msft Virtual Di...	100 GB	SAS		Virtual Disk	Automatic ˅	Integrated : Adapter 4 : Port 0 : Target (

Volume	Layout	Type	File System	Status	Capacity	Free Spa...	% Free
ClusterPerforman...	Simple	Basic	ReFS	Healthy (P...	9.94 GB	8.81 GB	89 %
System Reserved	Simple	Basic	NTFS	Healthy (S...	500 MB	465 MB	93 %
Temporary Storag...	Simple	Basic	NTFS	Healthy (P...	16.00 GB	14.07 GB	88 %
Windows (C:)	Simple	Basic	NTFS	Healthy (B...	126.51 GB	117.79 GB	93 %

Disk 5
Basic
9.98 GB
Reserved

ClusterPerformanceHistory
9.98 GB ReFS
Healthy (Primary Partition)

Failover Cluster Manager

File   Action   View   Help

Failover Cluster Manager
- FC2019
  - Roles
  - Nodes
  - Storage
    - Disks
    - Pools
    - Enclosures
  - Networks
  - Cluster Events

Disks (1)

Search | Queries ▼

Name	Status	Assigned To	Owner Node	Disk Numbe
Cluster Virtual Disk (Clust...	⊕ Online	Cluster Group	rg2019	

Cluster Virtual Disk (ClusterPerformanceHistory)

Virtual Disk Information

Pool Id:	4eff7b6b-4f57-4584-a23b-86312bad1128	Virtual Disk Id:	c8da4b03-c7ee-464a
Pool Name:	S2D on FC2019	Virtual Disk Name:	ClusterPerformanceHi
Pool Description:	Reserved for S2D	Virtual Disk Description:	
		Health Status:	Healthy
		Operational Status:	OK
		Resiliency:	Mirror, Columns: 1 , Im

Volumes (1)

ClusterPerformanceHistory (\\?\Volume{254343c4-2715-4c98-b220-33f4fbc8c1cf})
ReFS 8.85 GB free of 9.94 GB

Actions

Disks
- Add Disk
- Move Available Storage ▶
- View ▶
- Refresh
- Help

Cluster Virtual Disk (ClusterPerformanc...
- Bring Online
- Take Offline
- Information Details...
- Show Critical Events
- Replication ▶
- More Actions ▶
- Remove from Cluster Group
- Properties
- Help

Failover Cluster Manager
- FC2019
  - Roles
  - Nodes
  - Storage
    - Disks
    - Pools
    - Enclosures
  - Networks
  - Cluster Events

Pools (1)

Search | Queries ▼

Name	Status	Health Status	Owner Node	Operational Status
Cluster Pool 1	⊕ Online	Healthy	rg2019	OK

Cluster Pool 1

Status:	Online
Pool Id:	4eff7b6b-4f57-4584-a23b-86312bad1128
Pool Name:	S2D on FC2019
Pool Description:	Reserved for S2D
Physical Disk Number(s):	1003, 1002, 1004
Health Status:	Healthy
Operational Status:	OK
Free Space:	297 GB
Used Space:	768 MB
Capacity:	297 GB
Owner Node:	rg2019

Actions

Pools
- Add Storage Pool
- New Storage Pool
- View ▶
- Refresh
- Help

Cluster Pool 1
- Bring Online
- Take Offline
- Information Details...
- Show Critical Events
- Move ▶
- Add Virtual Disk
- New Virtual Disk
- More Actions ▶
- Remove
- Properties

```
            _         > Enable-ClusterStorageSpacesDirect
WARNING: 2019/03/09-14:06:10.745 Node rg2019: Disks not claimed - bb244ecf-4270-11e9-acf4-806e6f6e6963
WARNING: 2019/03/09-14:06:38.032 Node rg2019: No disks found to be used for cache

Node    EnableReportName
----    ----------------
rg2019 C:\windows\Cluster\Reports\EnableClusterS2D on 2019.03.09-14.06.38.htm
```

New-StoragePool -StorageSubSystemName "SOFSCLUSTER.local" -FriendlyName "S2D" -
WriteCacheSizeDefault 0 -ProvisioningTypeDefault Fixed -ResiliencySettingNameDefault Mirror -
PhysicalDisk (Get-StorageSubSystem -Name "SOFSCLUSTER.local" | Get-PhysicalDisk) -
LogicalSectorSizeDefault 4096 -FaultDomainAwarenessDefault PhysicalDisk

New-Volume -StoragePoolFriendlyName "S2D" -FriendlyName "CSVOL" -ResiliencySettingName Mirror -
PhysicalDiskRedundancy 1 -FileSystem CSVFS_ReFS -Size 276GB -AllocationUnitSize 64KB

Set-FileIntegrity "C:\ClusterStorage\CSVOL" –Enable $false

References

https://docs.microsoft.com/en-us/powershell/module/failoverclusters/enable-clusterstoragespacesdirect?view=win10-ps

https://docs.microsoft.com/en-us/windows-server/storage/storage-spaces/deploy-standalone-storage-spaces

https://www.danielstechblog.io/deploying-storage-spaces-direct-on-a-single-node-sofs-cluster/

More info

What's new in Windows Server 2019

•Cluster sets

Cluster sets enable you to increase the number of servers in a single software-defined datacenter (SDDC) solution beyond the current limits of a cluster. This is accomplished by grouping multiple clusters into a cluster set--a loosely-coupled grouping of multiple failover clusters: compute, storage and hyper-converged.With cluster sets, you can move online virtual machines (live migrate) between clusters within the cluster set.

•Azure-aware clusters

Failover clusters now automatically detect when they're running in Azure IaaS virtual machines and optimize the configuration to provide proactive failover and logging of Azure planned maintenance events to achieve the highest levels of availability. Deployment is also simplified by removing the need to configure the load balancer with Dynamic Network Name for cluster name.

•Cross-domain cluster migration

Failover Clusters can now dynamically move from one Active Directory domain to another, simplifying domain consolidation and allowing clusters to be created by hardware partners and joined to the customer's domain later.

•USB witness

You can now use a simple USB drive attached to a network switch as a witness in determining quorum for a cluster. This extends the File Share Witness to support any SMB2-compliant device.

•Cluster infrastructure improvements

The CSV cache is now enabled by default to boost virtual machine performance. MSDTC now supports Cluster Shared Volumes, to allow deploying MSDTC workloads on Storage Spaces Direct such as with SQL Server. Enhanced logic to detect partitioned nodes with self-healing to return nodes to cluster membership. Enhanced cluster network route detection and self-healing.

•Cluster Aware Updating supports Storage Spaces Direct

Cluster Aware Updating (CAU) is now integrated and aware of Storage Spaces Direct, validating and ensuring data resynchronization completes on each node. Cluster Aware Updating inspects updates to intelligently restart only if necessary. This enables orchestrating restarts of all servers in the cluster for planned maintenance.

•File share witness enhancementsWe enabled the use of a file share witness in the following scenarios:

◦Absent or extremely poor Internet access because of a remote location, preventing the use of a cloud witness.

◦Lack of shared drives for a disk witness. This could be a Storage Spaces Direct hyperconverged configuration, a SQL Server Always On Availability Groups (AG), or an * Exchange Database Availability Group (DAG), none of which use shared disks.

◦Lack of a domain controller connection due to the cluster being behind a DMZ.

◦A workgroup or cross-domain cluster for which there is no Active Directory cluster name object (CNO). Find out more about these enhancements in the following post in Server & Management Blogs: Failover Cluster File Share Witness and DFS.

We now also explicitly block the use of a DFS Namespaces share as a location. Adding a file share witness to a DFS share can cause stability issues for your cluster, and this configuration has never been supported. We added logic to detect if a share uses DFS Namespaces, and if DFS Namespaces is detected, Failover Cluster Manager blocks creation of the witness and displays an error message about not being supported.

•Cluster hardening

Intra-cluster communication over Server Message Block (SMB) for Cluster Shared Volumes and Storage Spaces Direct now leverages certificates to provide the most secure platform. This allows Failover Clusters to operate with no dependencies on NTLM and enable security baselines.

•Failover Cluster no longer uses NTLM authentication

Failover Clusters no longer use NTLM authentication. Instead Kerberos and certificate-based authentication is used exclusively. There are no changes required by the user, or deployment tools, to take advantage of this security enhancement. It also allows failover clusters to be deployed in environments where NTLM has been disabled.