

Configuring Storage Spaces Direct

Quick Start Guide

Microsoft **Storage Spaces Direct (S2D)** is a feature introduced in Windows Server 2016 Technical Preview, which enables building highly available and scalable storage systems by pooling local server storage. You can now build HA Storage Systems using storage nodes with only local storage, which is either disk devices that are internal to each storage node. This eliminates the need for a shared SAS fabric and its complexities, but also enables using devices such as SATA solid state drives, which can help further reduce cost or NVMe solid state devices to improve performance. Storage Spaces Direct leverages SMB3 for all intra-node communication, including SMB Direct and SMB Multichannel, for low latency and high throughput storage. This guide explains the method to configure the **hyper-converged** deployment scenario of S2D using Chelsio iWARP RDMA technology.

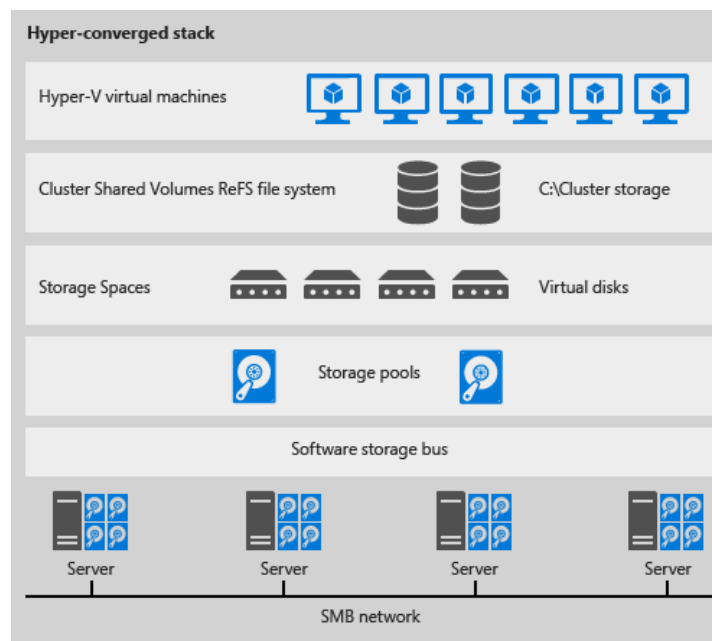


Figure 1 – S2D Hyper-Converged Stack

Follow the steps mentioned below to configure S2D:

1. Install Windows Server 2016 TP5 (Full/Core or Nano Server) on all cluster nodes.
2. Install Hyper-V and Failover cluster roles on all the nodes.
3. Install Chelsio T5 40G adapters on all the nodes in PCI Gen 3 x8 or x16 slots.
4. Connect both the ports of the Chelsio T5 40G adapter to a 40G switch.

Note: With Chelsio iWARP RDMA, no special configuration is needed on the switch.

5. Install latest Chelsio Unified Wire Driver from <http://service.chelsio.com/downloads/Microsoft/> on all the nodes.
6. Before creating the cluster, validate the nodes using the cluster validation tool. Run the following PowerShell command:

```
PS C:\Users\Administrator>Test-Cluster -Node <Node1,Node2,...> -Include  
"Storage Spaces Direct",Inventory,Network,"System Configuration"
```

7. Create a cluster using the nodes validated in the previous step:

```
PS C:\Users\Administrator>New-Cluster -Name <ClusterName> -Node  
<Node1,Node2,...> -NoStorage -StaticAddress <static_ip> -Verbose
```

Note: Without the *-NoStorage* parameter, the disks may be automatically added to the cluster and you will need to remove them before enabling Storage Spaces Direct. Otherwise they will not be included in the Storage Spaces Direct storage pool.

8. The disks intended to be used for Storage Spaces Direct need to be empty and without partitions or other data. If a disk has partitions or other data, it will not be included in the Storage Spaces Direct system.

Note: Storage Spaces Direct does not support disks connected via multiple paths, and the Microsoft Multipath MPIO software stack.

9. Enable Storage Spaces Direct and create a storage pool.

```
PS C:\Users\Administrator>Enable-ClusterS2D -PoolFriendlyName <pool_name>  
-Verbose
```

10. Create virtual disks on the storage pool created in the previous step.

```
PS C:\Users\Administrator>Get-ClusterNode |% { New-Volume -  
StoragePoolFriendlyName s2d -FriendlyName $_ -FileSystem CSVFS_ReFS -Size  
500GB -Verbose }  
PS C:\Users\Administrator>New-Volume -StoragePoolFriendlyName s2d -  
FriendlyName Collect -FileSystem CSVFS_ReFS -Size 100GB -Verbose
```

11. Create or deploy virtual machines. The virtual machine's files should be stored on the virtual disks. You can use utilities like VMFleet to deploy and use multiple virtual machines.