# Regional MSP Chooses DataON to Support a Nonprofit Organization

Strategic Online Systems Inc. (SOS) upgrades Youth Village's SAN Storage to a Storage Spaces Direct Solution

## The Challenge

SOS's goals to update Youth Villages' IT infrastructure, included:

- Utilize NVMe SSDs for caching
- Support for SQL (EMR database), Hyper-V, Exchange, VDI (9x RDS), and other enterprise applications
- Achieve at least 150K IOPS, supporting 2800 users
- Support 40TB usable storage, growing to 100TB in three years
- Support for RDMA networking
- Include a SDS management and monitoring software

## The Solution

- Cost-effective Windows SDS solution that is scalable and flexible
- Windows Server 2016 Storage Spaces Direct
- DataON S2D-3224i Hyper-Converged Cluster Appliance
- DataON MUST visibility and management tool

## The Result

- Simplified Windows SDS management compared to traditional SANs
- Capable of over 1M IOPS
- Supports more than 40+ VMs for Hyper-V
- Leverages SMB3 over RDMA for low latency and high CPU efficiency

## Company Overview

Youth Villages is a private nonprofit dedicated to helping thousands of emotionally and behaviorally troubled children and their families live successfully. Headquartered in Memphis, TN, Youth Villages has over 2700 employees across 72 sites in the United States.

Youth Villages partners with Strategic Online Systems, Inc. (SOS) as their managed service provider. SOS focuses on providing strategic planning, network support and equipment deployments for organizations that make a difference in their communities.

## IT Challenge: Upgrade Youth Villages' storage environment to a new software-defined solution with an eye for the future

SOS used a HP LeftHand iSCSI SAN with Super Micro servers and Cisco switches for Youth Villages' storage infrastructure. Their traditional SAN was rapidly aging, achieving only 5-10K IOPS. System performance was adversely affected during periods of peak demand on the servers.

SOS's goals for an updated Youth Villages' IT infrastructure, included:

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- Include a management and monitoring software

Another consideration for SOS was finding a solution that would still be viable in three years. Most of the leading hyper-converged solution providers have only been in business for a few years. With a rapidly consolidating market, it could be difficult to project which companies would have staying power. Choosing a Microsoft solution could allay that fear.

SOS had successfully deployed Windows Server 2012 R2 Storage Spaces in the past. They learned about the upcoming launch of Windows Server 2016 and were excited about its Storage Spaces Direct solution.

In the end, SOS decided to deploy a Windows Server 2016 Storage Spaces Direct solution with DataON storage for Youth Villages.

## The Solution:  DataON S2D-3224i with Microsoft Window Server 2016 and Storage Spaces Direct

Once SOS decided on a Windows Server 2016 Storage Spaces Direct solution, they researched offerings from Lenovo, HP, Dell, and Super Micro. However, they didn't think any of them were fully committed to supporting a Storage Spaces Direct solution.

SOS's search led them to DataON. They found that DataON had a growing reputation in the industry as the only experts on Storage Spaces Direct, due to their vast experience in designing and deploying Microsoft-based storage.

## DataON S2D-3224i

- **High Performance** – Hybrid SSDs/HDDs achieving over 1.5M IOPS in a 4-node cluster

- **Supports more VMs** – Supports 40+ Hyper-V VMs per node, with up to 16 nodes per cluster

- **Highly Scalable** – Delivers compute, networking and storage resources with near-linear scalability

- **Easy to Deploy** – Simple out-of-the-box setup and installation

- **Easy to Manage** – DataON's exclusive MUST software is pre-installed for infrastructure visibility and management

"Anybody can put out guidelines for how to deploy Storage Spaces Direct but customers don't view that as a complete solution. DataON is the ONLY real Microsoft Storage Spaces Direct vendor in this market," said Benjamin Clements, President, Strategic Online Systems, Inc. Multiple mentions about DataON at Microsoft's Ignite conference confirmed what they were hearing and they decided on a Storage Spaces Direct and DataON solution.

*"DataON is the ONLY real Microsoft Storage Spaces Direct vendor in this market."*
Benjamin Clements, President, Strategic Online Systems, Inc.

SOS was also looking for a good monitoring system to support their new hyper-converged cluster. DataON was able to respond to that requirement with their exclusive MUST (Management Utility Software Tool) visibility and management software, which is pre-configured with their S2D storage solutions. SOS was impressed with its powerful features, such as:

- Dashboard-level metrics from a single pane of glass
- System alerts based on Windows Health Service faults with built-in root cause analysis
- Call-home support that alert system administrators based on fault settings and severity levels

## MUST™
Visibility and Management

"MUST has been very valuable and was a big selling point. To us, it demonstrated a commitment from DataON to support storage as a service. The inclusion of MUST with the S2D appliance is what completes the solution with Storage Spaces Direct as a viable SAN replacement."

Benjamin Clements
President
Strategic Online Systems, Inc.

DataON deployed a proof of concept with their new S2D hyper-converged cluster appliance for testing with Storage Spaces Direct. SOS and Youth Villages were thrilled with the S2D's speeds, functionality, and scalability.

SOS purchased four DataON S2D-3224i hyper-converged cluster appliances (HCCAs) for Youth Villages' data center. Optimized for balanced IOPS and capacity, this all-flash NVMe and SATA SSD solution provides maximum flash performance in a 4-node cluster. It has been tested and certified to be part of the Windows Server Software-Defined (WSSD) program, following Microsoft's requirements and best practices for a Windows Server 2016 software-defined infrastructure. The S2D-3224i is also certified for Windows Server 2016 SDDC and Windows Server 2012 R2.

## Hardware Configuration and Deployment

There were some initial challenges with deploying the DataON and Storage Spaces Direct solution. SOS found that their existing Cisco switches did not support RDMA, and needed to replace them with Mellanox 40GbE switches. Being a newer technology, there was also a learning curve with deploying RDMA.

In SOS's previous Microsoft deployments, Storage Spaces only supported a SAS infrastructure. With Storage Spaces Direct, it leverages an Ethernet network and takes advantage of RDMA over Ethernet for a loss-less network with no packet drops.

| Hardware, Configuration, and Testing Tips for a S2D Storage and Microsoft SDDC Solution | |
|---|---|
| **Hardware** | • Make sure your system is certified for Microsoft SDDC for expandability and support.<br>• Decide on a converged versus hyper-converged infrastructure early on, as this will determine the number of CPU cores are needed.<br>• Make sure you have enough memory for each node/system because it will impact application memory allocation to workloads such as SQL. |
| **Networking** | • With S2D storage, use SMB3 multi-channel RDMA networking for consistent performance and low latency.<br>• Make sure your DCB switch supports RDMA, as well as supports priority flow control (PFC) .<br>• Make sure you setup your DCBx switch with the right parameters.<br>• In choosing a single-port RDMA NIC versus a dual-port RDMA NIC, consider your bandwidth saturation and need for dedicated data paths for PCIe 3.0 lanes.<br>• For best performance, use a 40GbE end-to-end network.<br>• Using a 40GbE to 10GbE splitter is not recommended. |
| **S2D Storage Setup** | • Make sure the VHDX for your Hyper-V VMs are configured with 4096 physical sector size (instead of 512) to ensure low latency and good performance.<br>• Make sure you understand your workloads' requirements before configuring S2D storage. For example, SQL databases require the write performance that 3-way mirroring provides on the SSD tier. Use MRV volumes only for read-heavy loads.<br>• Evaluate the endurance of each tier for daily writes. |
| **S2D Storage Testing & Validation** | • Use Microsoft Diskspd for testing and benchmarking. Use the cluster health PowerShell command line to validate your cluster setup at the system and virtual disk level.<br>• Use DataON MUST tool for real-time diagnostics.<br>• Use Resource Monitor inside VMs to identify high-latency processes. |

## Results

After setup and migration, Strategic Online Systems, Inc. and Youth Villages saw a significant performance improvement in their new virtualized environment. Youth Villages' database was now seeing:

- Improvement from 13-30ms delay to less than 1ms delay write on the storage
- Up to 30x reduced latency
- Able to accommodate bursts of up to 200,000 IOPS
- Able to withstand huge bandwidth bursts while still delivering 15K IOPS and low latency

In addition to the increased performance, SOS is happy with the reduced cost of their SAN replacement. They were able to save about 50% over the cost of a traditional SAN. Because Youth Villages is a nonprofit organization, SOS was also able to get a reduction in the price for their Microsoft Server 2016 licenses.

*"With our new Storage Spaces Direct solution, we have reduced storage costs by half, saving $150,000.… Making smart technology decisions lets us spend more in areas that directly impact our children, families, and young people, such as hiring more staff and improving residential campuses.*
*Our new storage solution has greatly improved productivity and alleviated employee frustration.… our employees [can] focus on what they do best: helping troubled youth."*
Cliff Reyle, Chief Human Resource and Information Officer, Youth Villages

SOS has been using DataON MUST with their S2D deployment. "MUST has been very valuable and was a big selling point. To us, it demonstrated a commitment from DataON to support storage as a service," said Clements. "The inclusion of MUST with the S2D appliance is what completes the solution with Storage Spaces Direct as a viable SAN replacement."

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## About Intel

Intel technology delivers cloud computing, real-time analytics, processing for your mission-critical business, and big data insights. It also improves data center efficiency and reliability to handle any workload.

The Intel® Data Center Blocks for Cloud (Intel® DCB for Cloud) and Microsoft Windows Server* 2016 include both single node and multi-node server systems.  Server systems within this product family were specifically created to offer Intel customers pre-configured systems that are Microsoft Windows Server 2016 certified. Intel has extensively tested these systems to ensure best operation and reliability with the Microsoft Windows operating environment.

## About DataON

DataON is the industry-leading provider of hyper-converged cluster appliances (HCCA) and storage systems optimized for Microsoft Windows Server environments. Our solutions are built with the single purpose of rapidly and seamlessly deploying Microsoft applications, virtualization, data protection, and hybrid cloud services. Our company is exclusively focused on customers who have made the "Microsoft choice" and we provide the ultimate platform for the Microsoft software-defined data center (SDDC). DataON is a division of Area Electronics Systems, Inc.