Case Study

**Solidigm™ TLC and QLC NAND SSDs (formerly Intel®) Data Center Storage**

# A Simpler Path to Microsoft Azure Stack HCI from DataON and Solidigm

## DataON relies on fast, reliable, and affordable Solidigm TLC NAND and QLC NAND SSDs to power its Integrated Systems for Azure Stack HCI.

DataON

intel 3D NAND SSD

**About DataON**

DataON is a hybrid cloud computing company focused on delivering Microsoft Azure Stack HCI, on-premises compute and storage systems, intelligent edge artificial intelligence (AI)/machine learning (ML) appliances, and Microsoft Azure hybrid cloud services.

DataON enterprise-level solutions, delivered as a complete, turnkey experience, are designed to provide high levels of performance, manageability, and security.

DataON is a Microsoft Gold Partner, a Microsoft Cloud Service Provider (CSP), and an Intel Platinum Partner.

Many businesses are modernizing their data centers with hyperconverged infrastructure (HCI) solutions based on Microsoft Azure Stack HCI. Azure Stack HCI helps solve two primary issues for organizations:

1. It consolidates and simplifies on-premises infrastructure by bringing together virtualized compute, storage, and networking on industry-standard x86 servers and components.
2. It provides built-in hybrid cloud capabilities and connections to popular Azure cloud services.

For businesses looking for a faster and simpler way to deploy Azure Stack HCI, DataON Integrated Systems for Azure Stack HCI let organizations hit the ground running with a prebuilt, tested, and validated solution. The offerings are built with optimized software running on Solidigm technology and reliable, low-latency Solidigm triple-level cell (TLC) NAND and quad-level cell (QLC) NAND NVM Express (NVMe) solid state drives (SSDs) (formerly Intel).

In addition to greater resource utilization and easier management, the solutions offer significant storage input/output (I/O) performance benefits to organizations that can help improve:

- Query times for analytics
- Virtual desktop infrastructure (VDI) startup times
- Video-editing performance
- Time to perform Microsoft SQL Server backups
- Access to large files, such as medical imaging records

## The need for on-premises workloads

Despite the popularity of cloud computing, many organizations still run many applications and workloads on premises. Companies have several reasons for keeping data on-site, from a need to meet regulatory

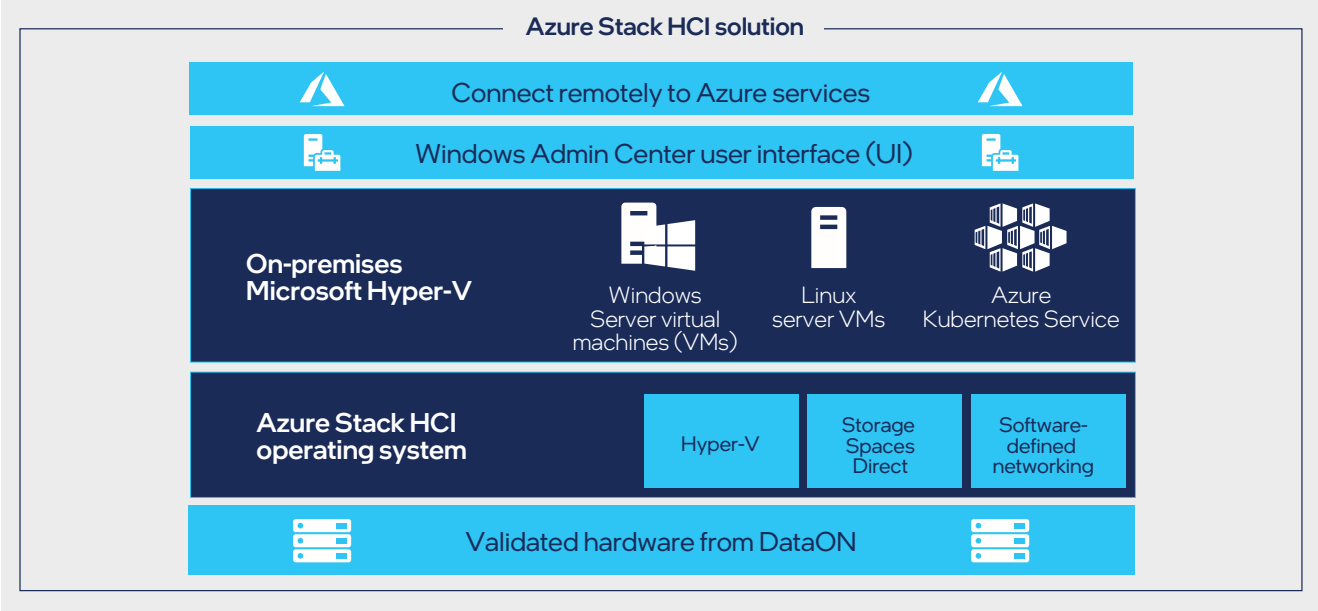


Figure 1. Azure Stack HCI lets organizations consolidate and extend on-premises infrastructure to the cloud

requirements, to cost or performance factors, to providing support for legacy workloads. At the same time, these organizations feel pressure to reduce costs and increase use in the data center.

One way to get the most from on-premises infrastructure without vastly expanding footprint or hardware expenditures is to deploy HCI, which virtualizes compute, storage, and networking on industry-standard hardware.

Thanks to these benefits, HCI has grown rapidly in popularity. According to a report by Meticulous Research, the HCI systems market is expected to grow at a compound annual growth rate (CAGR) of 24.1 percent from 2020 to 2028.[1]

Savvy organizations also realize they can get the best of both worlds—cloud computing and on-premises HCI—by deploying Azure Stack HCI.

Azure Stack HCI is a software-defined compute, storage, and networking cluster solution that runs virtualized Windows or Linux workloads on hardware that organizations control in their own data centers (Figure 1). The solution lets IT extend on-premises infrastructure to the cloud to take advantage of Azure hybrid services for consolidated management, monitoring, backups, and other services.

## Simplifying the move to Azure Stack HCI

To fully benefit from Azure Stack HCI, organizations need a way to ensure they are deploying the Microsoft software stack on proven hardware technology that can provide required performance and reliability for business-critical processes. But some organizations—particularly small to medium-sized businesses (SMBs)—might not have sufficient IT staff or budget to test, deploy, and tune hardware and software to optimize Azure Stack HCI clusters for their applications and workloads.

DataON Integrated Systems for Azure Stack HCI offer these organizations simplicity and performance that lets them quickly and easily modernize their data center infrastructures. The turnkey solutions offer optimized software built on trusted Intel® Xeon® Scalable processors, Intel Ethernet Network Adapters, and Solidigm TLC and QLC NAND NVMe SSDs.

Because they are also Intel Select Solutions, DataON Integrated Systems for Azure Stack HCI are pre-tested and validated for performance to meet strict standards set by Intel and Microsoft. (Learn more about Intel Select Solutions for Azure Stack HCI.)

## Solidigm NVMe SSDs bring data closer to the CPU

Underlying storage is a backbone for successful Azure Stack HCI deployments because it can make a critical difference in the performance, reliability, and scalability of the software-defined storage layer in your HCI. To help ensure fast, reliable data access, DataON uses high-performing Solidigm NVMe TLC and QLC NAND SSDs.

Unlike Serial-Attached SCSI (SAS) or Serial ATA (SATA) drives, NVMe drives have a direct connection to the PCIe bus on the motherboard, so they do not require the additional overhead of passing through a host controller interface. By avoiding this added layer, NVMe SSDs can make direct use of the high performance offered by the PCIe lanes for a much more efficient data flow, compared to SAS or SATA SSDs.

In addition, the 3D NAND architecture of Solidigm NVMe SSDs can boost application performance by providing high input/output operations per second (IOPS) with consistent low latency. For example, newer generation Solidigm NVMe SSDs, such as the Solidigm SSD D7-P5510 series (formerly Intel), have advanced from prior-generation PCIe 3.0 to PCIe 4.0. The PCIe 4.0–based Solidigm SSD D7-P5510 provides double the bandwidth capacity and a 50 percent increase in mixed (70/30 read/write) IOPS compared to the previous-generation Solidigm SSD DC P4510 (formerly Intel).[2]

## The key to performant software-defined storage

Solidigm NVMe SSDs provide high performance with consistent low latency for software-defined storage in DataON Integrated Systems for Azure Stack HCI. A recent article from StorageReview outlined testing performed on a DataON AZS-6224 Integrated System configured with five 3.84 TB Solidigm SSD D7-P5510 TLC NVMe drives per node. The tests measured performance on a three-node cluster running 168 virtual machines (VMs) with 20 GB of storage per VM. Using the VM Fleet benchmarking tool, the tests showed consistently high performance for small and large block random and sequential profiles. For example, an 8K random read workload with a 70/30 read/write mix generated 1.5M IOPS, with an average latency of 1.89 ms.[3]

By deploying low-latency Solidigm NVMe SSDs in an Azure Stack HCI solution from DataON, businesses can accelerate access to data while efficiently consolidating storage in the data center. Compared to a traditional storage-area network (SAN) architecture, the Solidigm and DataON solution also allows for increased scalability with high performance for large and growing datasets, more efficient backups, and many other scenarios. Users can see those benefits translated into improved user experiences across a wide range of use cases, including:

- Faster access to medical imaging in hospitals or clinics
- Faster video editing or distribution for production houses or content-delivery networks (CDNs)
- Faster query times for financial accounting and analytics
- Faster SQL Server backup times for improved business operations
- Faster VDI startup times for a better remote user experience

The solution also enables businesses to affordably transition from less reliable hard disk drives (HDDs) to SSDs, which bring higher quality and reliability that can reduce management and maintenance costs over HDDs. Additionally, an all-flash SSD solution offers the performance and reliability needed to support multiple workloads with high performance in a single HCI cluster. For example, an organization could host VDI sessions, SQL Server instances, and other applications on the same cluster and still maintain exceptional performance for the end-user desktops and applications. And by consolidating workloads, businesses have the potential to significantly reduce data center footprint, compared to using HDDs.

**According to an independent assessment, "The Gen4 NVMe-based DataON AZS-6224 Azure Stack HCI cluster really hit it out of the park in all areas in regard to performance. Peak bandwidth topped out at 91.5GB/s, which a couple of years ago would have been unheard of on a performance cluster, not to mention a 3-node HCI platform."[3]**

**— StorageReview**

## Optimize your storage with the right mix of Solidigm NVMe SSDs

Solidigm offers a wide variety of high-performing NVMe drives designed to meet a wide range of needs, based on applications, workloads, and usage. As a result, Solidigm TLC NAND and QLC NAND NVMe SSDs can be combined into an efficient and cost-effective all-flash design for software-defined storage. For example, organizations can deploy a DataON solution configured with an efficient multi-tier architecture built on NVMe TLC NAND SSDs (such as the Solidigm SSD D7-P5600 series, Solidigm SSD DC P4600 series, or Solidigm SSD DC P4610 series (formerly Intel) as a cache tier for reads/writes in front of higher capacity, affordable Solidigm SSD D5-P5316 QLC NAND drives (formerly Intel) as an all-flash tier for capacity storage.


**Figure 2.** The NVMe-based Solidigm SSD D5-P5316 can be used as affordable, reliable capacity storage in DataON Integrated Systems for Azure Stack HCI

Managed service providers (MSPs) can use this type of hybrid architecture to offer flexible capacity/performance options to their customers, backed by a high-endurance NVMe design that helps provide the reliability MSPs require to meet service-level agreements (SLAs).

## Innovative QLC NAND SSDs from Solidigm deliver NVMe performance at a compelling price

Solidigm QLC NAND NVMe SSDs offer an attractive price/performance ratio, with up-front costs similar to SAS and SATA drives. And unlike SAS or SATA drives that require a separate controller, Solidigm NVMe SSDs place data closer to the CPU by eliminating controller overhead for accelerated performance.

Solidigm SSDs are also available in innovative form factors, such as space-efficient enterprise and data center SSD form factor (EDSFF) drives. And Solidigm QLC NAND SSDs cover a wide range of capacities, from 7.68 TB to 30.72 TB, so you can scale your storage as needed across small or large environments.

## Deploy Azure Stack HCI with performance, reliability, and simplicity

DataON Integrated Systems for Azure Stack HCI help businesses fast-track the move to Azure Stack HCI and a hybrid cloud. The solutions rely on fast, reliable Solidigm TLC NAND and QLC NAND SSDs to accelerate performance and enable efficient consolidation for software-defined storage.

## Learn more

Solidigm TLC and QLC data center SSDs

DataON AZS Integrated Systems for Azure Stack HCI

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Find the solution that is right for your organization.
Contact your Solidigm representative or visit intel.com/csp.

[1] Meticulous Research. "Hyper-Converged Infrastructure (HCI) Systems Market Worth $42.1 Billion by 2028." September 2021. meticulousresearch.com/pressrelease/393/hyper-converged-infrastructure-systems-market-2028.

[2] Claim is based on Solidigm SSD D7-P5510, 7.684 TB 4 KB mixed 70/30 (400K) versus Solidigm SSD DC P4510, 8 TB (266K). Testing performed in October 2020.

[3] StorageReview. "DataON AZS-6224 Azure Stack HCI Review." October 2021. storagereview.com/review/dataon-azs-6224-azure-stack-hci-review.