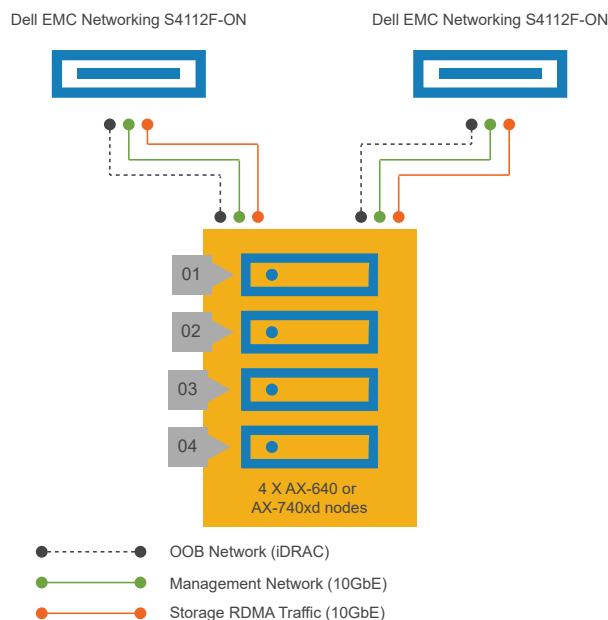# Dell EMC Solutions for Microsoft Azure Stack HCI

Affordable, Quick-Start Hyperconverged Infrastructure for Microsoft SQL Server in Any Remote and Edge Environment

Microsoft SQL Server requires a strong infrastructure foundation that provides high transactional and throughput performance, availability, reliability and scalability to meet varying business demands, especially for key enterprise and mission critical applications. Having a properly sized and configured infrastructure can increase application performance, uptime and reduce capital expenses. In a database environment, it's also important to consolidate multiple components to reduce data center footprint and costs. Scaling SQL Server can be also a tedious and time-consuming undertaking especially in ROBO environments that touches multiple systems, databases, memory, storage, CPU and network adapters. Hence, making the right infrastructure decisions from the start is important for database scalability.

Hyperconverged Infrastructure for Microsoft SQL Server

Built on software-defined compute, storage, and networking features of Microsoft Windows Server 2019, Dell EMC Solutions for Azure Stack HCI delivers a fully productized, validated and supported HCI solution that enables enterprises to modernize their infrastructure for improved application uptime and performance, simplified management and operations, and lower total cost of ownership. Organizations can also utilize AX nodes, powered by industry leading PowerEdge server platforms, which offer a high performance, scalable and secure foundation to build a software-defined infrastructure using Microsoft Azure Stack HCI.

For customers looking to adopt a hyperconverged infrastructure to run SQL Server workloads, Dell EMC Solutions for Azure Stack HCI with SQL provides a compelling infrastructure solution. There are several benefits to running SQL Server on Azure Stack HCI: high performance design, simple scalability, availability and management, hybrid capabilities and improved TCO.

Dell EMC Networking S4112F-ON   Dell EMC Networking S4112F-ON

01
02
03
04

4 X AX-640 or
AX-740xd nodes

- - - - - - OOB Network (iDRAC)
———— Management Network (10GbE)
———— Storage RDMA Traffic (10GbE)

Dell EMC 4 node configuration for Azure Stack HCI provides a pre-qualified solution with detailed deployment guidance

Dell EMC Solutions for Microsoft Azure Stack HCI
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High Transactional and Throughput Performance: Microsoft SQL Server 2017 and 2019 deliver breakthrough mission-critical capabilities with in-memory performance and operational analytics built in. Modern web scale applications demand lower latency and high transactional performance from underlying storage. AX nodes with options for all-flash, all-NVMe and with Intel® Optane™ persistent memory, an innovative memory technology delivering a unique combination of affordable large capacity and support for data persistence, along with low latency 100Gb RDMA network adapters, provide a high-performance compute and storage tier for database workloads. Dell EMC internal testing[1] on Azure Stack HCI cluster built using 4 AX nodes each with ten Intel® SSD DC P4510 NVMe drives and configured with 3-way mirror volumes achieved:

- 2.95M IOPS with an average read latency of 242µs in a VMfleet test configured for 4K block sizes and 100% reads

- 0.8M IOPS with an average write latency of 412 µs in a VMfleet test configured for 4K block sizes and 100% writes

For analytics workloads sensitive to throughput, the same four node cluster delivered up to 63GB/s 100% Read and 9GB/s 100% write throughput with 512KB block size.

Scalability and Availability: The Azure Stack HCI architecture allows for seamless scalability of compute, memory, network and storage resources of the cluster without any downtime. Up to 16 AX nodes can be added to a single cluster providing a robust high-performance infrastructure solution with built-in fault tolerance features to maximize uptime as per application requirements. For example, using 3-way mirror in conjunction with dual parity in a cluster with four or more nodes, the cluster can tolerate losing up to 2 node or two drives (in different hosts), while keeping the cluster running.

Consolidation and TCO Savings: Upgrading from an older version of Microsoft SQL Server to SQL Server 2019 offers multiple benefits that come not only from new functionality, but also the ability to consolidate contracts and save costs if you're using separate vendors for business intelligence (BI), advanced analytics and data warehousing. In addition, data in Microsoft SQL Server can be on-premises, hybrid and public cloud, with a consistent experience across all three platforms.

The scalable, high-performance and highly available architecture of Azure Stack HCI enables customers to consolidate multiple workloads running on legacy infrastructure to a single modern HCI platform. A Dell EMC study[2] showcased how customers can consolidate 11 dedicated servers with an external SAN running a SQL Server workload to a single four node Azure Stack HCI cluster which not only provides better performance but is also 60% less expensive. The same study also showcased that an on-premise HCI solution was approximately 29% less expensive than a comparatively configured public cloud offering from Amazon Web Services (AWS) while providing more than 5 times flash capacity.

Simplified Management: Compared to legacy architectures, the software defined infrastructure architecture of Azure Stack HCI enables cluster management architecture that is simple to manage with the Windows Admin Center (WAC), PowerShell or Microsoft Systems Center Consoles with a goal of simplifying day to day management of Azure Stack HCI clusters, Dell EMC has integrated management of AX Nodes and S2D Ready Nodes into the Microsoft Windows Admin Center (WAC) console. The Dell EMC Integration for Windows Admin Center allows our customers to manage Azure Stack HCI clusters from a single pane of glass. The integration provides health monitoring, hardware inventory, and compliance reporting the AX nodes. By using this extension, infrastructure administrators can monitor and manage all their clusters in real time and check if the nodes are compliant to Dell EMC recommended firmware and driver versions.
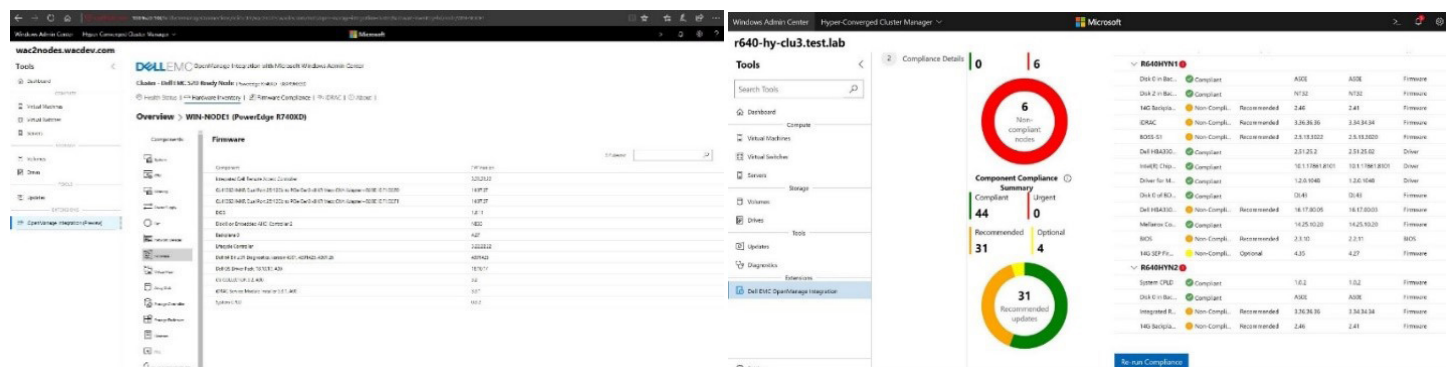
Dell EMC OpenManage Integration with Microsoft Windows Admin Center (OMIMSWAC)

[1] Dell EMC internal testing using VMFleet benchmark.

[2] Dell EMC Solutions for Microsoft SQL: SQL Server 2017.

End to End Solution from Dell EMC: When architecting a solution for mission critical applications, customers want to have a peace of mind of relying on an end-to-end solution that has been certified, validated and supported by qualified personnel. With this goal in mind, Dell EMC brings the best of breed products, technologies and services to deliver our solutions for Azure Stack HCI. The AX nodes are certified HCI nodes with pre-qualified components, tested and validated with Dell PowerSwitch 1/10/25/100Gb Ethernet switches and supported globally by our team of our highly qualified professionals. Dell Technologies is also a Microsoft Gold certified business intelligence and analytics partner. Customers can rely on our expertise across your full spectrum of Microsoft SQL Server, business intelligence, and Big Data needs.

Hybrid Connectivity: Customers wanting to extend or protect their on-prem applications using public cloud infrastructure will find value in using Microsoft Azure Services such as:

- Azure Backup to support backing up and restore of SQL Server with application consistency.

- Azure Blob Storage service for SQL Server to backup and restore to Azure Blob Storage service. This service is suitable for off-site archiving.

- Azure Monitor a centralized hub to track what is happening across SQL server, network, and infrastructure.

Hyperconverged Infrastructure for ROBO

ROBO environments offer an easy way to deploy and offer an affordable starter infrastructure that includes deployment services and support. A 4 node consist of four Storage Spaces Direct Ready Nodes in a cluster configuration and fixed network components freeing up time to focus on high priority business demands.

This quick-start solution is available in both hybrid and all-flash configurations, each of which has three sizes—small, medium, and large. The solution is built on the R740xd Storage Spaces Direct Ready Node (for hybrid) and R640 Storage Spaces Direct Ready Node (for all-flash) building use cases for high availability and performance.

Supporting private cloud or hybrid cloud strategies

When it comes to the cloud, Dell EMC Solutions for Microsoft Azure HCI supports a full private cloud model connecting seamlessly with Microsoft Azure for a hybrid cloud strategy. For organizations who may be looking to store archived SQL Server data off-premise but who still need to query the data for reporting and analytics, Dell Technologies provides customers the ability to adopt a hybrid Azure cloud model.

A Trusted Advisor

Realize benefits that many other customers around the globe have experienced in working with Dell Technologies—a certified, award-winning Microsoft partner. Our holistic approach to providing a modern, scalable and resilient IT infrastructure, combined with comprehensive consulting and deployment services for your Microsoft environment, can help you minimize risk and business disruption—making us the partner of choice for your Microsoft Azure Stack HCI and SQL Server endeavors.

Recommended Offerings: Dell EMC all-flash/NVM-e AX-640 and AX-740xd nodes running Windows Server 2019, Microsoft SQL Server 2017/2019, Dell EMC 10/25/100Gb PowerSwitch Networking, Dell EMC Deployment and Consulting Services.

Learn more about
Dell EMC Solutions for
Microsoft Azure Stack HCI

Contact a Dell EMC Expert
1-866-438-622

D&LL Technologies