AZURE STACK HCI: HIGH-PERFORMANCE MICROSOFT SQL SERVER

Leverage your Azure Stack HCI investment to run Microsoft SQL Server for highly available and highly performant enterprise database applications. Azure Stack HCI with Microsoft SQL Server also provides the ability to use Azure Site Recovery to migrate, restore, and protect customers' data. Below, you will find a how-to guide for deploying Microsoft SQL Server on Azure Stack HCI that includes:

- Solution overview
- Step by step documentation to deploy Microsoft SQL Server on Azure Stack HCI

Overview of High-performance Microsoft SQL Server

Azure Stack HCI provides enterprise customers a highly available, cost efficient, flexible platform to run a high-performance Microsoft SQL Server leveraging the power of state-of-the-art hardware and Storage Spaces Direct. Azure Stack HCI presents a highly competitive solution for delivering exceptionally performant Microsoft SQL Server. Whether running Online Transaction Processing (OLTP) workloads, or Data Warehouse and BI, to AI and advanced analytics over Big Data, you will benefit from the resiliency that Azure Stack HCI offers. This is especially important for mission critical databases. Leveraging the flexibility to run SQL Server in VMs (Windows Server or Linux), it allows you to consolidate multiple database workloads and easily scale out by adding additional VMs to the Azure Stack HCI environment as needed.

Additionally, Azure Stack HCI enables you to integrate Microsoft SQL Server with Azure Site Recovery service to provide a cloud-based migration, restoration, and protection solution for your organization's data that is reliable and secure.

DataON Integrated Systems for Azure Stack HCI

DataON Integrated Systems for Azure Stack HCI are designed for remote office/branch offices, edge, and IoT deployments. These deployments can present a challenge for IT departments because of constrained budgets, space and power footprints, and limited IT resources.

Integrated Systems provide a fully integrated appliance-like hybrid cloud experience, delivering the fastest time-to-value through the convenience of pre-installed software, integrated drivers, and firmware updates. Simple to deploy and procure, they're ideal for customers who require turnkey solutions with little deployment effort from IT staff.

DataON Integrated Systems can be optimized for high performance with all-NVMe storage or balanced capacity and storage with flexible hybrid NVMe cache and SSD/HDD storage. With Azure Stack HCI, customers can get great resiliency with nested two-way mirroring.

DataON is an exclusive Microsoft partner, with over 100 Integrated Systems and validated nodes in the Microsoft Azure Stack HCI Catalog, as well as over 1000 HCI clusters and 150PB of storage deployed. DataON is a Microsoft Gold Partner, Microsoft Cloud Service Provider (CSP). and an Intel Strategic OEM Partner.

DataON MUST and MUST Pro for Windows Admin Center

DataON MUST and MUST Pro are included with DataON Integrated Systems. DataON MUST provides real-time monitoring & alerts for Azure Stack HCI. It features a centralized dashboard, historic data reporting, enhanced disk mapping, email alerts, and call home services. MUST Pro integrates with Microsoft's cluster aware updating (CAU)

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functionality to simplify deployment and updates to Azure Stack HCI, with minimal disruptions to your infrastructure. It checks and ensures that servers have the same OS version, drivers, firmware, BIOS, and BMC. It also checks the drivers and firmware for network cards, host bust adapters, and SSD and HDD drives. With a single click, your entire cluster can be updated, helping to you secure against the latest server exploits.

How to deploy Microsoft SQL Server on Azure Stack HCI

1. Hardware and OS configuration for Azure Stack HCI

DataON AZS-6112 Integrated Systems for Azure Stack HCI are optimized for size & performance, with 3rd Generation Intel® Xeon® Scalable processors and all-NVMe flash storage.

DataON AZS-6112	DataON AZS-6212	DataON AZS-6224		DataON AZS-108	DataON AZS-212	DataON AZS-216
Optimized for size & performance	Optimized for IOPS & capacity	Optimized for IOPS & performance		Optimized for size & performance	Optimized for IOPS & capacity	Optimized for IOPS & performance
2 to 16 Nodes				2 to 16 Nodes		
All-NVMe flash storage	Hybrid storage	All-NVMe flash storage		All-NVMe flash storage	Hybrid storage	All-NVMe flash storage
1U / 1-Node Rack 12x 2.5" Bays	2U / 1-Node Rack 2x 2.5"/3.5" NVMe + 10x 3.5" SAS/SATA	2U / 1-Node Rack 24x 2.5" Bays		1U / 1-Node Rack 8x 2.5" Bays	2U / 1-Node Rack 12x 3.5" Bays	2U / 1-Node Rack 16x 2.5" Bays
3rd Generation Intel® Xeon® Scalable processors				**2nd Generation** Intel® Xeon® Scalable processors		
Up to 12TB DDR4				128GB to 1.5TB DDR4		
Intel® NVMe SSDs				Intel® NVMe SSDs		
25GbE RDMA networking				25GbE RDMA networking		

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Step by Step guide to deploy Azure Stack HCI.
Install Windows Admin Center (WAC) for managing Azure Stack HCI.

2.   Set up Microsoft SQL Server on Azure Stack HCI

Set up Windows Server or Linux VM
    a.   Install SQL Server on Linux
    b.   Install SQL Server on Windows

3.   Monitoring and performance tuning

To ensure performance and health of your Microsoft SQL Server instances on Azure Stack HCI, it is important that appropriate monitoring and tuning is put in place. Additional SQL Server database engine tutorials are included here.

For tuning SQL Server 2016/2017 for high performance, the following recommended practices are provided.

4.   High Availability (HA)

Azure Stack HCI leverages Windows Server Failover Clustering (WSFC) and can be utilized to support Microsoft SQL Server running in VMs (designed to help with hardware failure).   Microsoft SQL Server also offers Always On availability groups (AG) which provides database-level high availability and is designed to help with application and software faults. In addition to WSFC and AG, Azure Stack HCI can also leverage Always On Failover Cluster Instance (FCI) based on using Storage Spaces Direct technology for shared storage. All of these options can leverage the Microsoft Azure Cloud witness for quorum control. It is recommended that cluster AntiAffinity rules in WSFC be leveraged for the VMs to be placed on different physical nodes in order to maintain uptime for SQL Server in the event of host failures when you configure Always On availability groups.

5.   Set up Azure hybrid services

Azure Site Recovery offers business continuity and disaster recovery (BCDR) strategy. Set up disaster recovery for SQL Server allows organizations to protect the SQL Server back end of an application to help keep your data safe, and your apps and workloads online, when planned and unplanned outages occur.

Azure Backup supports backing up and restoring Microsoft SQL Server with application consistency. Install Azure Backup Server to start backup of your on-prem SQL data.

Alternatively, you can also leverage Azure Blob Storage service for SQL Server to backup and restore to Azure Blob Storage service. This is suitable for off-site archiving. To manage the Azure Blob Storage backups, you can leverage the Managed SQL Backup feature included in Microsoft SQL Server.

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In addition to the backup scenario, you can setup other database services that Microsoft SQL Server (Microsoft SQL Server 2016/2017/2019) offers, connecting to Azure services such as (but not limited to) Azure Data Factory, and Azure Feature Pack for Integration Services (SSIS).

Summary

With completion of a Microsoft SQL Server deployment using Azure Stack HCI, you now have a platform capable of running complex, highly available database workloads in VMs.