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.

How to deploy Microsoft SQL Server on Azure Stack HCI

1. Hardware and OS configuration for Azure Stack HCI

   Supermicro has offered various product lines, including the latest gen X13 Hyper 2U, X13 UP CloudDC 1U, X13 UP WIO 1U, X12 2U Mainstream, X12 Ultra, BigTwin 2U 4-Node, UP, X11 Ultra servers, and AMD based A+ H13 1U&2U Hyper, H13 GrandTwin 2U4N, A+ H13 1U CloudDC AS -1115CS-TNR, H12 1U Ultra, 1U WIO and X13 2U 4-node GrandTwin SYS-211GT-HNC8R with the most computing power, flexible storage architecture and high-speed networking, perfect for high-performance SQL Server scenarios.

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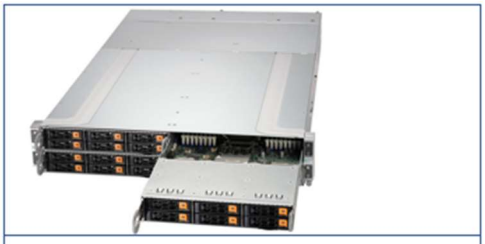
X13 2U 4-node GrandTwin SYS-211GT-HNC8R

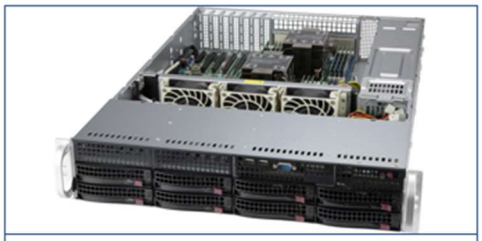


Supermicro SYS-211GT-HNC8R

Scale
4 to 16 nodes

Single Node Data
- 8 to 64 cores Intel 5th Gen
- 256GB to 4TB memory
- 4.8TB to 92TB raw storage
- NVMe
- 25GbE (Up to 100GbE)

X12 2U Mainstream:



Supermicro SYS-620P-TR

Scale
2 to 16 nodes

Single Node Data
- 16 to 80 cores Intel 3rd Gen
- 128GB to 1024GB memory
- 8TB to 160TB raw storage
- HDD
- 25GbE (Up to 100GbE)

X13 Hyper 2U Hybrid:

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Supermicro SYS-621H-TN12R – Hybrid

Scale
2 to 16 nodes

Single Node Data
- 15 to 120 cores Intel 4th Gen
- 128GB to 4TB memory
- 4TB to 160TB raw storage
- NVMe + HDD
- 25GbE (Up to 100GbE)

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X13 UP CloudDC 1U All-flash NVMe:

Supermicro SYS-111C-NR – All Flash NVMe

Scale
1 to 16 nodes

Single Node Data
- 8 to 60 cores Intel 4th Gen
- 64GB to 2TB memory
- 3.75TB to 76.8TB raw storage
- NVMe
- 25GbE (Up to 100GbE)

X13 UP WIO 1U All-flash SATA SSD:

Supermicro SYS-511E-WR-HCI – All Flash SSD

Scale
1 to 4 nodes

Single Node Data
- 8 to 52 cores Intel 4th Gen
- 64GB to 1TB memory
- 4TB to 31TB raw storage
- SATA SSD
- 25GbE (Up to 100GbE)

Supermicro SYS-111E-WR-HCI – All Flash SSD

Scale
1 to 4 nodes

Single Node Data
- 8 to 52 cores Intel 4th Gen
- 64GB to 1TB memory
- 4TB to 76.8TB raw storage
- SATA SSD
- 25GbE (Up to 100GbE)

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A+ H13 CloudDC 1U/2U All-Flash NVMe:

Supermicro AS-1115CS-TNR – All Flash NVMe

Scale
1 to 4 nodes

Single Node Data
- 16 to 128 cores AMD 4th Gen
- 192GB to 3.072TB memory
- 3.84TB to 150TB raw storage
- NVMe
- 25GbE (Up to 100GbE)

Supermicro AS-1015CS-TNR – All Flash NVMe

Scale
1 to 4 nodes

Single Node Data
- 16 to 128 cores AMD 4th Gen
- 192GB to 3.072TB memory
- 3.84TB to 60TB raw storage
- NVMe
- 25GbE (Up to 100GbE)

Supermicro AS-2015CS-TNR – All Flash NVMe

Scale
1 to 4 nodes

Single Node Data
- 16 to 128 cores AMD 4th Gen
- 192GB to 1. 152TB memory
- 3.84TB to 180TB raw storage
- NVMe
- 25GbE (Up to 100GbE)

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A+ H13 Hyper 1U and 2U All-flash NVMe:

Supermicro AS -2025HS-TNR-HCI – All Flash NVMe

Scale
1 to 4 nodes

Single Node Data
- 32 to 256 cores AMD 4th Gen
- 384GB to 3TB memory
- 7.68TB to 184.32TB raw storage
- NVMe
- Up to 100GbE

Supermicro AS -1125HS-TNR-HCI – All Flash NVMe

Scale
1 to 4 nodes

Single Node Data
- 32 to 256 cores AMD 4th Gen
- 384GB to 3TB memory
- 15.36TB to 61.44TB raw storage
- NVMe
- Up to 100GbE

A+ H13 GrandTwin 2U4N All-flash NVMe:

Supermicro AS -2115GT-HNTR-HCI – All Flash NVMe

Scale
4 to 16 nodes (4-node in a system)

Single Node Data
- 16 to 84 cores AMD 4th Gen
- 192GB to 768TB DDR5 memory
- 15TB to 31TB raw storage
- NVMe
- Up to 100GbE

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A+ H12 Ultra 1U All-flash:

Supermicro AS -1124US-TNRP–HCI – All Flash NVMe

Scale
2 to 16 nodes

Single Node Data
- 16 to 128 cores (AMD 3rd Gen)
- 128GB to 8TB memory
- 15.36TB to 92.16TB raw storage
- NVMe (Gen4)
- Up to 100GbE

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A+ H12 WIO 1U All-flash:

Supermicro AS -1114S-WN10RT–HCI – All Flash NVMe

Scale
2 to 16 nodes

Single Node Data
- 8 to 64 cores (AMD 3rd Gen)
- 128GB to 4TB memory
- 15.36TB to 76.8TB raw storage
- NVMe (Gen4)
- Up to 100GbE

Supermicro AS -1114S-WN10RT–HCI – All Flash SSD

Scale
2 to 16 nodes

Single Node Data
- 8 to 64 cores (AMD 3rd Gen)
- 128GB to 4TB memory
- 960GB to 76.8TB raw storage
- SATA SSD
- Up to 100GbE

X12 BigTwin 2U 4-Node All-flash:

Supermicro SYS-220BT-HNC8R–HCI – All Flash NVMe

Scale
4 to 16 nodes (1 to 4 systems)

Single Node Data
- 16 to 72 cores (intel 3rd Gen)
- 128GB to 4TB memory
- 15.36TB to 46.08TB raw storage
- NVMe (Gen4)
- Up to 100GbE

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X12 Ultra 1U All-flash:

Supermicro SYS-120U-TNR– HCI – All Flash NVMe + SSD

Scale
2 to 16 nodes

Single Node Data
- 16 to 80 cores (intel 3rd Gen)
- 128GB to 4TB memory
- 3.75TB to 75TB raw storage
- NVMe + SSD
- Up to 100GbE

X12 UP 1U All-flash:

Supermicro SYS-510P-MR – HCI – All Flash NVMe

Scale
2 to 4 nodes

Single Node Data
- 8 to 32 cores (intel 3rd Gen)
- 64GB to 256GB memory
- 4TB to 32TB raw storage
- NVMe
- 25GbE

Supermicro SYS-510P-MR – HCI – All Flash SSD

Scale
2 to 4 nodes

Single Node Data
- 8 to 32 cores (intel 3rd Gen)
- 64GB to 256GB memory
- 3.84TB to 30.4TB raw storage
- SSD
- 25GbE

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X11 Ultra 1U/2U All-flash/Hybrid:

Supermicro SYS-1029U-TN10RT-HCI

Scale
2 to 16 nodes

Single Node Data
- 8 to 56 cores (intel)
- 128GB to 6TB memory
- 4TB to 153TB raw storage
- NVMe
- Up to 100GbE

Supermicro SYS-2029U-TN24R4T- HCI

Scale
2 to 4 nodes

Single Node Data
- 8 to 56 cores (intel)
- 128GB to 6TB memory
- 4TB to 367TB raw storage
- NVMe
- Up to 100GbE

Supermicro SYS-6029U-E1CR4-HCI – ALL Flash

Scale
2 to 16 nodes

Single Node Data
- 8 to 56 cores (intel)
- 128GB to 6TB memory
- 12TB to 96TB raw storage
- NVMe + SSD
- Up to 100GbE

Supermicro SYS-6029U-E1CR4-HCI - Hybrid

Scale
2 to 16 nodes

Single Node Data
- 8 to 56 cores (intel)
- 128GB to 6TB memory
- 12TB to 96TB raw storage
- NVMe + SSD + HDD
- Up to 100GbE

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Plan Hardware Deployment
Please contact us for comprehensive deployment guidance.

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.