

# AZURE STACK HCI: HIGH-PERFORMANCE MICROSOFT SQL SERVER

Technical Use Cases  
for Azure Stack HCI



Branch office  
and edge



Virtual desktop  
infrastructure



High-performance  
Microsoft SQL Server



Trusted enterprise  
virtualisation



Scale-out  
storage

This solution leverages your Azure Stack HCI investment to run Microsoft SQL Server for highly available and highly performant enterprise database applications. It also provides customers' easy backup to Azure with hybrid connectivity built in. 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

## Solution Overview

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 advance 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 Backup service and Azure Blob Storage service to provide cloud-based backup solutions that are reliable and secure.

## How to deploy Microsoft SQL Server on Azure Stack HCI

### 1. Hardware and OS configuration for Azure Stack HCI

Fujitsu recommends the 2U dual-socket PRIMERGY RX2540 M5 rack server system as the best fit for the High-performance Microsoft SQL Server scenario. Please see below the configuration options that have been certified according to the Azure Stack HCI program.



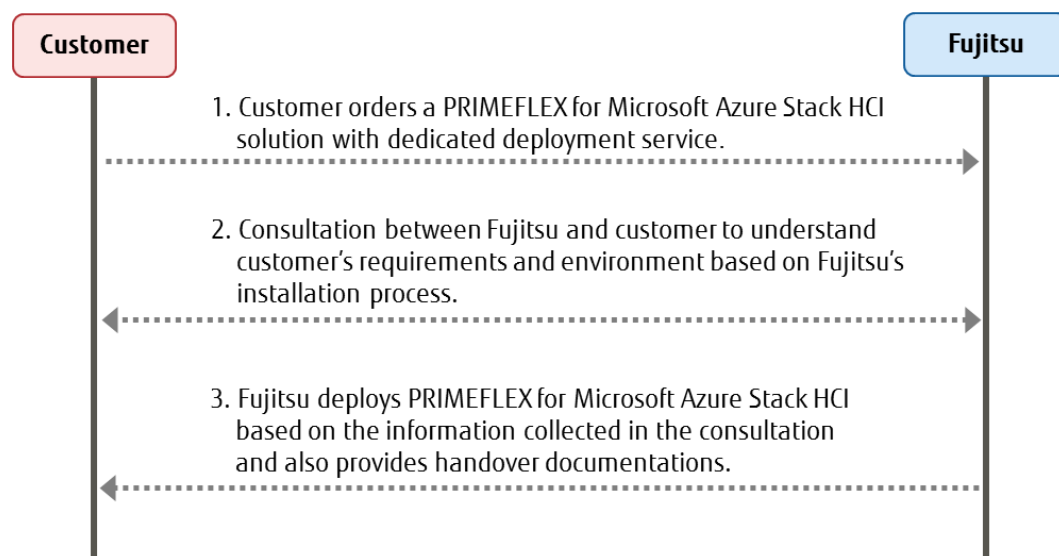
Type		Hybrid: SSD+HDD	All-Flash: All-SSD	All-Flash: NVMe+SSD
Server		PRIMERGY RX2540 M5(2.5" or 3.5" )	PRIMERGY RX2540 M5(2.5")	
Scalability		2 to 16 nodes		
CPU		2x Intel Xeon Silver 4208 or better (16-56 cores)		
Memory		64GB to 3TB		
Drives	Cache	2-12x 2.5" or 2-6x 3.5" SSD SAS/ SATA (800 GB per node or higher)	-	2-4x 2.5" NVMe (3.2 TB per node or higher)
	Capacity	4-22x 2.5 " or 4-10x 3.5" HDD SAS/SATA (2.4 TB per node or higher)	4-24x 2.5" SSD SAS/SATA (1.92TB per node or higher)	4-24x 2.5" SSD SAS/SATA (1.92TB per node or higher)
Network		2x PLAN EP QL41xxx	2x PLAN EP MCX4-LX 25Gb 2p SFP28 LP	
RDMA / TPM 2.0		yes / yes		
HBA		Fujitsu PSAS CP400i SAS		

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## Deployment and Support

[Fujitsu Product Support Services](#) provide installation and support services for hardware and software. With the Fujitsu SolutionPacks, Fujitsu provides a special Infrastructure Support package that is designed to offer a single point of contact for all components (Fujitsu and third-party) of a Fujitsu infrastructure solution.

Customers can acquire Fujitsu Product Support Services for deployment of Azure Stack HCI the following way:



The following tasks are done by Fujitsu professional engineers:

- All power and network cabling.
- Installation and update Windows Server 2019 Datacentre.
- Configuration of Windows Server 2019 features, cluster, network, and Hyper-V.

## Infrastructure Management

For an efficient management of the complete hardware infrastructure, Fujitsu recommends [Fujitsu Software Infrastructure Manager \(ISM\)](#) providing a converged management for both the physical and the virtual environment, including compute, storage and network devices. ISM provides the following key features:

- A dashboard with a customisable layout providing you with all relevant information to make quick and proactive decisions
- Monitoring of all critical server components including CPU and memory utilisation
- Alerting in case of system failures to quickly identify affected components
- Firmware updates of all hardware components in a Azure Stack HCI cluster (covers server, storage and switch devices)

### [Step by Step guide to deploy Azure Stack HCI](#)

1. Install Windows Server 2019 Datacentre (follow guidance above for network connectivity for Clustering)
2. Add Roles and Features
3. Setup Failover Clustering and enable a Cluster Witness
4. Setup Storage Spaces Direct

[Install Windows Admin Centre \(WAC\)](#) to manage Windows Server and Windows Server VMs.

The step 1 to 4 above are done by Fujitsu Product Support Services.

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## 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 insure 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 utilised 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 scenarios

[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.

In addition to the backup scenario, you can set up 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 Replica](#), [Stretch Database](#), [Azure Data Factory](#).

## Summary

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

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