AZURE STACK HCI: BRANCH OFFICE AND EDGE

Technical Use Cases
for Azure Stack HCI

Branch office and edge	Virtual desktop infrastructure	High-performance Microsoft SQL Server	Trusted enterprise virtualization	Scale-out storage
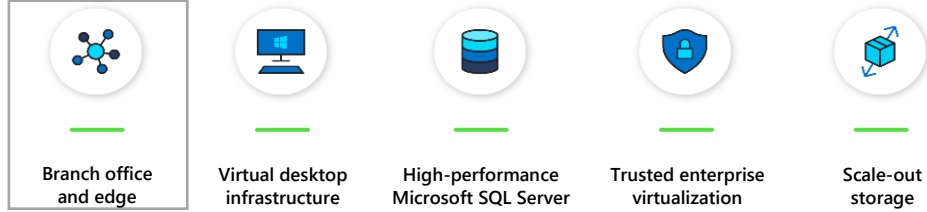
Leverage your Azure Stack HCI investment to run key virtual applications and workloads in a highly available, resilient fashion on hardware designed for Branch office and edge scenarios with industry-leading support for 2 node configurations including: Nested resiliency, USB thumb drive cluster witness, and browser-based administration via Windows Admin Center. Below, you will find a how-to guide for Azure Stack HCI Branch office and edge configurations that includes:
- Plan and deploy HPE hardware and OS/tools to support Azure Stack HCI Branch office and edge scenarios
- Step by step documentation to enable Branch office and edge support including IoT and cloud-driven Container management

1. Hardware and OS configuration for Branch office and edge environments

HPE ProLiant Servers

The following are listed as 2-Node-Optimized Rack solutions with expansion up to 4 nodes:

HPE DL360 Gen10 All Flash SAS

Scale:
- 2 to 16 nodes

Single Node Data:
- CPU: 4-56 cores (Intel)
- RAM: 64GB to 3TB
- Raw storage: 3.2TB to 60.4TB + 160TB JBOD
- Storage type: SSD (SAS)
- Network speed: Up to 25Gb

Learn more

HPE DL360 Gen10 Hybrid SAS

Scale:
- 2 to 16 nodes

Single Node Data:
- CPU: 4-56 cores (Intel)
- RAM: 64GB to 3TB
- Raw storage: 4TB to 19.2B + 60TB JBOD
- Storage type: SSD (SAS) + HDD (SAS)
- Network speed: Up to 25Gb

Learn more

HPE DL360 Gen10 Hybrid NVMe SAS HDD

Scale:
- 2 to 16 nodes

Single Node Data:
- CPU: 4-56 cores (Intel)
- RAM: 64GB to 3TB
- Raw storage: 4TB to 19.2B + 60TB JBOD
- Storage type: NVMe + HDD (SAS)
- Network speed: Up to 25Gb

Learn more

Hewlett Packard Enterprise

HPE DL360 Gen10 All Flash NVMe

Scale:
- 2 to 16 nodes

Single Node Data:
- CPU: 4-56 cores (Intel)
- RAM: 64GB to 3TB
- Raw storage: 6.4TB to 150TB
- Storage type: NVMe
- Network speed: Up to 25Gb

HPE DL180 Gen10 Hybrid SATA +SAS

Scale:
- 2 to 4 nodes

Single Node Data:
- CPU: 4-48 cores (Intel)
- RAM: 64GB to 1TB
- Raw storage: 4.8TB to 43.2TB
- Storage type: SSD (SATA) + HDD (SAS)
- Network speed: Up to 25Gb

Learn more

HPE DL325 Gen10 All Flash SATA

Scale:
- 2 to 4 nodes

Single Node Data:
- CPU: 8-64 cores (AMD)
- RAM: 64GB to 2TB
- Raw storage: 3.84TB to 38TB
- Storage type: SSD (SATA)
- Network speed: Up to 25Gb

Learn more

HPE DL325 Gen10 All Flash SAS

Scale:
- 2 to 4 nodes

Single Node Data:
- CPU: 8-64 cores (AMD)
- RAM: 64GB to 2TB
- Raw storage: 3.2TB to 60.4TB + 160TB JBOD
- Storage type: SSD (SAS)
- Network speed: Up to 25Gb

Learn more

HPE DL325 Gen10 Hybrid SAS

Scale:
- 2 to 4 nodes

Single Node Data:
- CPU: 8-64 cores (AMD)
- RAM: 64GB to 2TB
- Raw storage: 4TB to 19.2B + 60TB JBOD
- Storage type: SSD (SAS) + HDD (SAS)
- Network speed: Up to 25Gb

Learn more

HPE DL325 Gen10 Hybrid NVMe SAS HDD

Scale:
- 2 to 4 nodes

Single Node Data:
- CPU: 8-64 cores (AMD)
- RAM: 64GB to 2TB
- Raw storage: 4TB to 19.2B + 60TB JBOD
- Storage type: NVMe + HDD (SAS)
- Network speed: Up to 25Gb

Learn more

Hewlett Packard Enterprise

The following are listed as 2 to 16 node 2U solutions which provide many additional storage options:

HPE DL380 Gen10 Hybrid NVMe SAS SSD+HDD

Scale:
- 2 to 16 nodes

Single Node Data:
- CPU: 4-56 cores (Intel)
- RAM: 64GB to 3TB
- Raw storage: 2.4TB to 100TB + 168TB JBOD
- Storage type: NVMe + SSD (SAS) + HDD (SAS)
- Network speed: Up to 100Gb

Learn more

HPE DL385 Gen10 All Flash NVMe

Scale:
- 2 to 16 nodes

Single Node Data:
- CPU: 8-128 cores (AMD)
- RAM: 64GB to 4TB
- Raw storage: 6.4TB to 270TB
- Storage type: NVMe
- Network speed: Up to 100Gb

Learn more

HPE DL385 Gen10 Hybrid NVMe SAS SSD+HDD

Scale:
- 2 to 16 nodes

Single Node Data:
- CPU: 8-128 cores (AMD)
- RAM: 64GB to 4TB
- Raw storage: 2.4TB to 100TB + 168TB JBOD
- Storage type: NVMe + SSD (SAS) + HDD (SAS)
- Network speed: Up to 100Gb

Learn more

HPE DL380 Gen10 Hybrid SATA/SAS

Scale:
- 2 to 16 nodes

Single Node Data:
- CPU: 4-56 cores (Intel)
- RAM: 64GB to 3TB
- Raw storage: 4TB to 168TB + 168TB JBOD
- Storage type: SSD (SATA) + HDD (SAS)
- Network speed: Up to 100Gb

Learn more

HPE DL380 Gen10 Hybrid SAS

Scale:
- 2 to 16 nodes

Single Node Data:
- CPU: 4-56 cores (Intel)
- RAM: 64GB to 3TB
- Raw storage: 2.4TB to 168TB + 168TB JBOD
- Storage type: SSD (SAS) + HDD (SAS)
- Network speed: Up to 100Gb

Learn more

HPE DL385 Gen10 All Flash SATA

Scale:
- 2 to 16 nodes

Single Node Data:
- CPU: 8-128 cores (AMD)
- RAM: 64GB to 4TB
- Raw storage: 3.84TB to 115TB
- Storage type: SSD (SATA)
- Network speed: Up to 100Gb

Learn more

![Microsoft logo]

HPE DL380 Gen10 All Flash SAS

Scale:
- 2 to 16 nodes

Single Node Data:
- CPU: 4-56 cores (Intel)
- RAM: 64GB to 3TB
- Raw storage: 3.2TB to 192TB + 153TB JBOD
- Storage type: SSD (SAS)
- Network speed: Up to 100Gb

Learn more

HPE DL380 Gen10 Hybrid NVMe SAS HDD

Scale:
- 2 to 16 nodes

Single Node Data:
- CPU: 4-56 cores (Intel)
- RAM: 64GB to 3TB
- Raw storage: 2.4TB to 140TB + 168TB JBOD
- Storage type: NVMe + HDD (SAS)
- Network speed: Up to 100Gb

Learn more

HPE DL385 Gen10 Hybrid SAS

Scale:
- 2 to 16 nodes

Single Node Data:
- CPU: 8-128 cores (AMD)
- RAM: 64GB to 4TB
- Raw storage: 1.2TB to 168TB + 168TB JBOD
- Storage type: SSD (SAS) + HDD (SAS)
- Network speed: Up to 100Gb

Learn more

HPE DL380 Gen10 All Flash SATA

Scale:
- 2 to 16 nodes

Single Node Data:
- CPU: 4-56 cores (Intel)
- RAM: 64GB to 3TB
- Raw storage: 1.92TB to 115TB
- Storage type: SSD (SATA)
- Network speed: Up to 100Gb

Learn more

HPE DL385 Gen10 Hybrid NVMe SAS HDD

Scale:
- 2 to 16 nodes

Single Node Data:
- CPU: 8-128 cores (AMD)
- RAM: 64GB to 4TB
- Raw storage: 2.4TB to 140TB + 168TB JBOD
- Storage type: NVMe + HDD (SAS)
- Network speed: Up to 100Gb

Learn more

HPE DL380 Gen10 All Flash NVMe

Scale:
- 2 to 16 nodes

Single Node Data:
- CPU: 4-56 cores (Intel)
- RAM: 64GB to 3TB
- Raw storage: 6.4TB to 270TB
- Storage type: NVMe
- Network speed: Up to 100Gb

Learn more

Hewlett Packard Enterprise

HPE DL385 Gen10 All Flash SAS

Scale:
- 2 to 16 nodes

Single Node Data:
- CPU: 8-128 cores (AMD)
- RAM: 64GB to 4TB
- Raw storage: 3.2TB to 192TB + 153TB JBOD
- Storage type: SSD (SAS)
- Network speed: Up to 100Gb

Learn more

DL380 Gen10 Hybrid Intel Optane DC PMEM SAS SSD

Scale:
- 2 to 16 nodes

Single Node Data:
- CPU: 4-56 cores (Intel)
- RAM: 64GB to 3TB
- Raw storage: 3.3TB to 192TB + 153TB JBOD
- Storage type: PMEM + SSD (SAS)
- Network speed: Up to 100Gb

Learn more

The following are listed as 2-Node-Optimized Tower solutions with expansion up to 4 nodes:

HPE ML350 Gen10 Hybrid SAS

Scale:
- 2 to 4 nodes

Single Node Data:
- CPU: 4-56 cores (Intel)
- RAM: 64GB to 3TB
- Raw storage: 1.6TB to 144TB
- Storage type: SSD (SAS) + HDD (SAS)
- Network speed: Up to 25Gb

Learn more

HPE ProLiant Servers

See the following HPE ProLiant Azure Stack HCI Solution technical white papers for your specific solution:
- HPE ProLiant DL180 Gen10 Platforms a50000730enw

Hewlett Packard Enterprise

- HPE ProLiant DL325 Gen10 Platforms a50000731enw
- HPE ProLiant DL360 Gen10 Platforms a50000732enw
- HPE ProLiant DL380 Gen10 Platforms a50000694enw
- HPE ProLiant DL385 Gen10 Platforms a50000695enw
- HPE ProLiant ML350 Gen10 a00067827enw

HPE Edgeline Servers

The Edgeline family and features a rugged, compact form factor that makes it suitable for remote and harsh edge locations. It comes with one-click provisioning and remote systems management, enabling the ongoing management of EL8000 systems across thousands of distributed locations without on-site IT expertise. And it is based on open industry standards. For more information see: https://www.hpe.com/us/en/servers/edgeline-systems.html.

Also see the HPE Edgeline EL8000 Converged Edge System Chassis Manager User Guide, HPE Edgeline EL8000 Converged Edge System Getting Started Guide and HPE Edgeline EL8000 Converged Edge System Setup and Configuration Guide for detailed information from the Enterprise Support Center.

HPE Edgeline EL8000 All Flash NVMe

Scale:
- 2 to 4 nodes

Single Node Data:
- CPU: 8-24 cores (Intel 2nd Gen)
- RAM: 64GB to 768TB
- Raw storage: 3.8TB to 15.3TB
- Storage type: NVMe (M.2)
- Network speed: Up to 40Gb

Learn more

Plan Hardware Deployment

For complete configuration guidance see our whitepaper: Implementing Windows Server 2019 Storage Spaces Direct using HPE ProLiant servers.

HPE Solutions optimized for branch office and edge scenarios will share the following common feature for ease of deployment and management:

Network and Switch Connectivity. Nodes can be interconnected using network switches that are properly configured to handle the bandwidth and networking type. If using RDMA with RoCE protocol, network device and switch configuration is extremely important.

Switchless option for 2 node cluster interconnect. The Storage Spaces Direct hardware requirements, allow for nodes to be interconnected using direct networking cable connections, without a network switch. In a switchless configuration it is required that every node have a direct connection with every other node of the cluster.

[Step by Step guide to deploy Azure Stack HCI](#)
1. Install Windows Server 2019 Datacenter (follow guidance above in network connectivity for Clustering)
2. Add Roles and Features
3. Setup Failover Clustering and enable a Cluster Witness
4. Setup Storage Spaces Direct
5. Install Windows Admin Center (WAC)

From Windows Admin Center (WAC), Set up **Azure Monitor** to gain insight into your application, network and server health of your Azure Stack HCI Branch office and edge deployment.
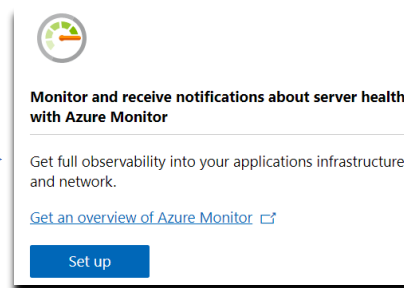
Additionally, you can Set Up additional Azure hybrid services such as Backup, File Sync, Site Recovery, Point-to-Site VPN, Update Management, and Security Center in WAC.

Monitor and receive notifications about server health with Azure Monitor

Get full observability into your applications infrastructure, and network.

Get an overview of Azure Monitor

Set up

2. Enable Branch office and edge Modern Application Support

Once your Azure Stack HCI Branch office and edge setup is complete, follow the steps below to enable your environment to support modern Container-based application development and IoT data processing by deploying a VM running Azure IoT Edge.

What is Azure IoT Edge?

- *Open source software from Microsoft*
- *Runs on Windows or Linux*
- *Built to run "on the edge" for near-real time responses*
- *Secured by software and hardware mechanisms*
- *Available AI Toolkit https://github.com/Azure/ai-toolkit-iot-edge*

- *Open programmability: Java, .Net Core 2.0, Node.js, C and Python support*
- *Offline and intermittent connectivity support*
- *Natively managed from Azure IoT Hub*

...combines AI, cloud and edge computing to containerize cloud workloads—such as Azure Cognitive Services, Machine Learning, Stream Analytics, and Functions—and run them locally on devices from a Raspberry Pi to an industrial gateway or converged edge server and manages edge applications / devices with Azure IoT Hub.

How do I deploy Azure IoT Edge on Azure Stack HCI?

1. [Create a VM on your Azure Stack HCI using Windows Admin Center](#)
    (For supported OS versions, VM types, processor architectures and system requirements, click [here](#))
2. If you do not already have an Azure account, get your free account [here](#)
3. [Create an Azure IoT Hub](#) in the Azure Portal
4. [Register an IoT Edge device](#) in the Azure Portal
    (The IoT Edge "device" is the Windows or Linux VM running on your Azure Stack HCI installation)
5. [Install and start the IoT Edge runtime](#) on the VM you created in step 1
    (You will need the device string created in step 4 above to connect the runtime to your Azure IoT Hub)
6. [Deploy a module to IoT Edge](#)
    (Pre-built modules can be sourced and deployed from the [IoT Edge Modules section of the Azure Marketplace](#))

NOTE: In addition to gathering and processing IoT data from IoT sensors, Azure IoT Edge can also be utilized to deploy Containers with general purpose usage capabilities. Adding Azure IoT Edge to your Azure Stack HCI Branch office and edge deployments modernizes your environment to support [CI/CD pipeline](#) application deployment framework. Your DevOps personnel can deploy and iterate on Containerized applications that IT builds and supports via traditional VM management processes and tools.

Summary

With completion of the Azure Stack HCI Branch office and edge deployment and the installation and configuration of Azure IoT Edge, you now have a platform capable of running complex, highly available workloads in VMs and Containers for Branch office and edge deployments.