

AZURE STACK HCI: BRANCH OFFICE AND EDGE

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 Lenovo ThinkAgile MX1000 series 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

How to deploy branch office and edge on Azure Stack HCI

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

Lenovo ThinkAgile MX1000 series consist of MX1020 appliances also known as Azure Stack HCI Integrated Systems and MX1021 certified nodes also known as validated nodes are purpose-built for Remote Office/Branch Office (RoBo) environments. The ThinkAgile MX1000 series is a new, one of a kind, edge server from Lenovo, based on ThinkSystem SE350. The MX1000 series is available as an appliance node or certified node from Lenovo, leveraging all the hyperconverged features of Azure Stack HCI, making it easy for the customers to size, deploy, and manage their infrastructure through the lifecycle of the product.

New Class of Edge Servers

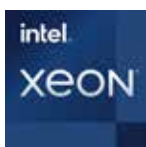
Today, you need computing resources, and therefore servers, almost everywhere—not just in the data center, but remotely as well. However, for performance reasons, your remote data-generating devices must be close to computing and storage resources. Hence the Lenovo ThinkSystem SE350 Edge server. Its small footprint and power efficiency allow for reliable server-class performance at many Edge locations.

The rugged SE350 can handle temperatures from 0° to 55°C, as well as tolerate locations with high-dust and vibration—such as construction site trailers and manufacturing floors. It can be deployed equally well in a traditional office or branch location due to its office-friendly acoustics. The half-width, short depth, 1U SE350 can be installed almost anywhere: hung on a wall, stacked on a shelf, or mounted in a rack.

This small form-factor yet high-performance server, powered by the Intel® Xeon® D processor, features up to 16 cores, 256GB of DDR4 RAM, 10Gbe NICs and 16TB of internal M.2 solid-state storage.



Lenovo ThinkAgile MX1000 series Integrated System



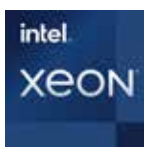
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Making Microsoft Azure Stack HCI solutions easy the Lenovo way

Microsoft Azure Stack HCI solutions provide validated Storage Spaces Direct solutions. ThinkAgile MX Appliances (also known as Integrated Systems) and Certified Nodes (also known as Validated Nodes) take this a step further, packaging Azure Stack HCI solutions into easy-to-use machine types to provide ease of ordering, enforced configuration rules, best recipe firmware, ThinkAgile Advantage support (where available) and optional services (deployment, management)

ThinkSystem SE350 specifications:

Components	Specification
Form factor	Edge server, 40mm x 215mm, 1U high.
Processor	One Intel® Xeon® D-2100 Series processor (formerly codenamed "Skylake D"). Supports processors up to 16 cores, core speeds of up to 2.2 GHz, and TDP ratings of up to 100W. Processor is soldered onto system board.
Memory	4 DIMM slots. Up to 256GB maximum with 4x 64GB LRDIMMs
Drive bays	Up to 3x M.2 adapters (1x boot adapter, 2x data adapters) can be installed with a total of 10x M.2 drives. <ul style="list-style-type: none"> 1x Single M.2 Adapter (1 drive) or 1x Dual M.2 Adapter (2 drives) installed in dedicated slot, for boot 1x 4-bay PCIe x16 adapter in dedicated bay, for 4x M.2 drives, NVMe or SATA, for data 1x 4-bay PCIe x16 adapter in PCIe riser slot, for 4x M.2 adapters, NVMe only, for data
Maximum data storage	NVMe drives: 16 TB using 8x 2TB NVMe drives SATA & NVMe drives: 15.68 TB using 4x 1.92 TB SATA drives + 4x 2TB NVMe drives
Storage controller	Onboard SATA controller supporting RAID 0, 1, 5, 10 (Intel RSTe)
Network interfaces	Networking depends the network module selected: <ul style="list-style-type: none"> Wired network module (10G SFP+ LOM package): 2x 10GbE SFP+, 2x 1GbE RJ45 (support 10/100 Mbps), 2x dedicated ports for remote management (redundant connections or daisy-chain capable). Port 1 of the 10GbE ports can be shared with the XCC management processor for Wake-on-LAN and NC-SI support. Wireless network module (Wireless enabled LOM package): 802.11ac Wi-Fi and LTE, 2x 10GbE SFP+, 2x 1GbE SFP, 2x 1GbE RJ45 (support 10/100 Mbps), dedicated port for remote management. Port 1 of the 10GbE ports can be shared with the XCC management processor for Wake-on-LAN and NC-SI support. <p>Note: This feature has not been tested with Azure Stack HCI yet and is not available for HCI.</p> <p>The PCIe 3.0 x16 slot can also be used for an additional network card if desired.</p>
PCI Expansion slots	One PCIe 3.0 x16 slot
Ports	Front: Two USB 3.1 G1 (5 Gb/s) ports, VGA port, One or two dedicated RJ-45 1GbE systems management port, one mini-USB port. Rear: Two USB 2.0 ports, one RJ-45 serial port
Cooling	Three non-hot-swap 40 mm fans (all 3 standard), N+1 redundant in most configurations.
Power supply	Two choices for power input: 12V DC using one or two external AC power adapters with plugged inputs OR - 48V DC using a hardwired Telco connection.
Security features	ThinkShield Key Vault Portal web site for security management. Trusted Platform Module, supporting TPM 2.0. In China only, optional Nationz TPM 2.0. Front locking bezel, Kensington cable slot with intelligent lock position switch, G-sensor trigger for motion detection, intrusion detection, self-encrypting drive (SED) support, power-on password, administrator's password.
Dimensions	Height: 43 mm (1.7 in.), width: 209 mm (8.2 in.), depth: 376 mm (14.8 in.)
Weight	Maximum: 3.75 kg (8.3 lb)



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1) Plan Hardware Deployment

The ThinkAgile MX1000 series is a Microsoft validated Azure Stack HCI 2-node ROBO solution in a switchless direct-connect configuration with the following specifications:

Processor:	Intel® Xeon® D processor with 8 or 16 cores 64GB to
Memory:	256GB TruDDR4 memory
Boot drives:	2x 480GB M.2 SATA SSDs
Storage Controller:	On Board SATA AHCI Mode
Data drives:	4x ThinkSystem M.2 5100 6Gbps Non-Hot Swap SATA SSDs in capacities from 480GB, 960GB or 1.92TB
Network:	10 GbE connections routed from the networking functions integrated in the Xeon-D processor
Supports	iWARP (Internet wide area RDMA protocol)
Switchless:	Direct-connect configuration


[Step by Step guide to deploy Azure Stack HCI:](#) For Azure Stack HCI deployment planning on Lenovo ThinkAgile MX, refer to this very popular [Microsoft Storage Spaces Direct Deployment Guide](#).

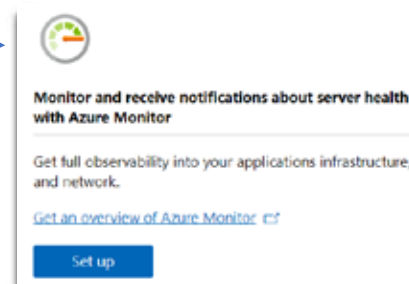
[Install Windows Admin Center \(WAC\)](#) to manage Windows Server and Windows Server VMs.

Microsoft Windows Admin Center (WAC) is a browser-based application that is deployed locally and used to manage Windows Servers, Windows Server Clusters and Azure Stack HCI clusters. Microsoft has made WAC extensible so that hardware partners can build additional features specific to their hardware and firmware. Lenovo XClarity Integrator is an example of one such extension implementation. Lenovo XClarity Integrator is designed to help users to manage and monitor the Lenovo ThinkSystem servers through Lenovo XClarity Administrator in Windows Admin Center. Lenovo XClarity Integrator and Windows Admin Center run in the same environment. Lenovo XClarity Integrator that is integrated with Lenovo XClarity Administrator can be used as an out-of-box management tool and a high-efficiency tool for managing and monitoring the Lenovo servers and components, for example, monitoring the overall status of servers, viewing the inventory of components, checking the firmware consistency of cluster nodes, and launching the management interface.

This [link](#) provides information on features in the Lenovo XClarity Integrator extension and instructions for installing the extension for Windows Admin Center.

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.



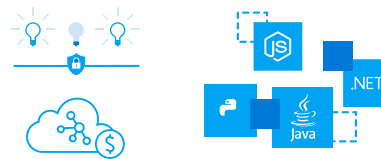
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2. Enable Branch office and edge Modern Application support

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 Lenovo ThinkAgile MX1000 series solution for Azure Stack HCI platform capable of running complex, highly available workloads in VMs and Containers for Branch office and edge deployments.

