

# Lenovo ThinkAgile MX3520-H Appliance and MX Certified Node with Hybrid Storage for Microsoft Azure Stack HCI (Xeon SP Gen 2)

## Product Guide

The Lenovo ThinkAgile MX3520-H Appliance and MX Certified Node with hybrid storage are 2U rack-mount systems that support two processors, up to 1.5 TB of memory, and 14x LFF hot-swap drive bays with an extensive choice of SSDs for cache and HDDs for capacity.

ThinkAgile MX Series platforms offer the choice of new Azure Stack HCI Appliance (Integrated System) MX3520 or Azure Stack HCI Certified Node (Validated Node). These validated platforms help modernize on-premises infrastructure with pre-tested, pre-configured, and easy-to-order configurations, with seamless Azure integration. As a new direct and indirect Microsoft Cloud Solution Provider, Lenovo offers cloud services and subscriptions through the Lenovo Cloud Marketplace, which enable HCI use cases with the ThinkAgile MX platforms.

The **ThinkAgile MX3520 Azure Stack HCI Appliance (Integrated System)** include the new Azure Stack HCI operating system, which is delivered as an Azure subscription service via the Microsoft CSP program. It also includes ThinkAgile Advantage support with one single point of contact for support of the hardware and warm-case transfer for software. Deployment and Update features in Windows Admin Center and tight integration with Lenovo XClarity make cluster management, hardware and software update management & enforcing site-wide policies easy for administrators. Azure hybrid by design, native integration with Azure services makes it easy for customers to adopt a hybrid cloud strategy for their workloads and use cases.

The **ThinkAgile MX Azure Stack HCI Certified Nodes (Validated Nodes)** deliver fully validated and integrated Lenovo hardware and firmware that is certified for Microsoft Azure Stack HCI solutions. These HCI Certified Nodes have the option of Windows Server 2019 Datacenter Edition for HCI functionality, and guest licenses are included.



Figure 1. Lenovo ThinkAgile MX3520-H Appliance and MX Certified Node for Hybrid Storage

### Did you know?

The ThinkAgile MX3520-H Appliance and MX Certified Node are built on industry-leading Lenovo ThinkSystem servers that feature enterprise-class reliability, management, and security. They deliver fully validated and integrated hardware and firmware that is certified for Microsoft Azure Stack HCI solutions.

## Key features

The ThinkAgile MX3520-H Appliance offers the following key features:

- Quick and convenient path to implement a hyperconverged solution powered by the new Azure Stack HCI OS with Hyper-V virtualization, Microsoft Storage Spaces Direct (S2D), Software Defined Storage (SDS), and Software Defined Networking (SDN) network virtualization.
- Streamlined management of Azure Stack HCI with unified single-pane-of-glass for creating and managing VMs, S2D volumes, and virtual networks through Windows Admin Center.
- Consistent, low latency performance with hypervisor-embedded architecture, built-in read and write cache, and support for NVMe PCIe drives.
- Provides per-VM storage performance management with policy-driven Quality of Service (QoS) and continuous built-in monitoring and alerting with cluster-wide performance and capacity metrics.
- Can sustain drive, server, or component failures with built-in resiliency for continuous availability.
- GPU support to enable AI training, inferencing and data visualization scenarios, HPC workloads, virtual desktops and graphics intensive applications.
- Built on proven and reliable Lenovo ThinkSystem servers that provide compute power and space efficiency for a variety of edge workloads and applications.
- Provides comprehensive hardware management with advanced systems management capabilities with XClarity
- Delivers fully validated and integrated hardware and firmware that is certified for Microsoft Azure Stack HCI solutions.
- Ready for out-of-box deployment with the mandatory Azure Stack HCI OS preloaded, with the option to purchase a Windows Server 2019 Datacenter license if unlimited guest OS VMs are desired.
- Includes Lenovo ThinkAgile Advantage Single Point of Support for quick 24/7 problem reporting and resolution.
- Includes Lenovo deployment services to get customers up and running quickly.

The ThinkAgile MX Certified Node offers the following key features:

- Quick and convenient path to implement a hyperconverged solution powered by Windows Server 2019 Datacenter with Hyper-V virtualization, Microsoft Storage Spaces Direct (S2D), Software Defined Storage (SDS), and Software Defined Networking (SDN) network virtualization.
- Streamlined management of Azure Stack HCI with unified single-pane-of-glass for creating and managing VMs, S2D volumes, and virtual networks through Windows Admin Center.
- Consistent, low latency performance with hypervisor-embedded architecture, built-in read and write cache, and support for NVMe PCIe drives.
- Provides per-VM storage performance management with policy-driven Quality of Service (QoS) and continuous built-in monitoring and alerting with cluster-wide performance and capacity metrics.
- Can sustain drive, server, or component failures with built-in resiliency for continuous availability.
- GPU support to enable AI training, inferencing and data visualization scenarios, HPC workloads, virtual desktops and graphics intensive applications.
- Built on proven and reliable Lenovo ThinkSystem servers that provide compute power and space efficiency for a variety of edge workloads and applications.
- Provides comprehensive hardware management with advanced systems management capabilities.
- Delivers fully validated and integrated hardware and firmware that is certified for Microsoft Azure Stack HCI solutions.
- Ready for out-of-box deployment with the optional Windows Server 2019 Datacenter preload.
- Provide flexibility in using the existing Microsoft Windows Server 2019 enterprise license agreements

- or purchasing new software licenses from Microsoft or Lenovo.
- Optional Lenovo deployment services to get customers up and running quickly.

## Components and connectors

The following figure shows the front view of the MX3520-H Appliance and MX Certified Node for hybrid storage.

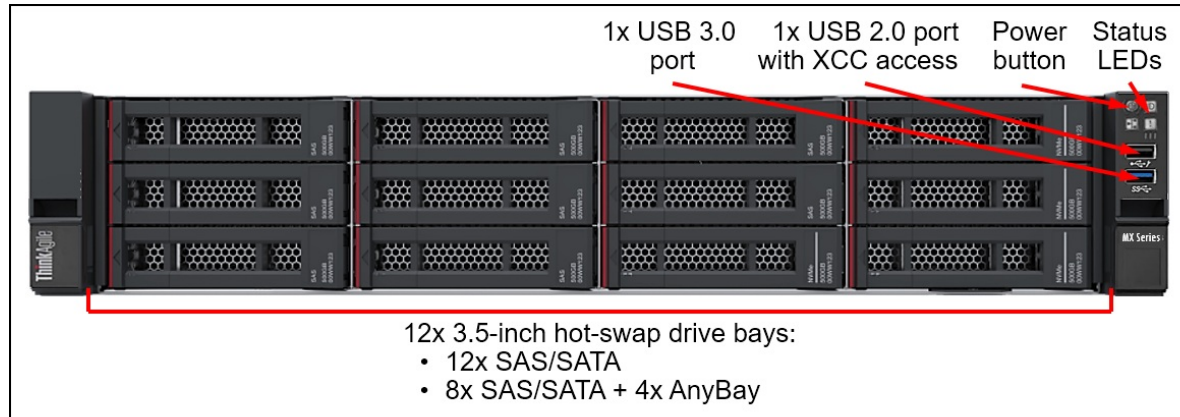


Figure 2. Front view - ThinkAgile MX3520-H Appliance and MX Certified Node for Hybrid Storage

The front of the MX systems includes the following components:

- 12x LFF hot-swap drive bays
- One USB 2.0 port with XClarity Controller access
- One USB 3.0 port
- A Power button
- Status LEDs

The following figure shows the rear view of the MX systems.

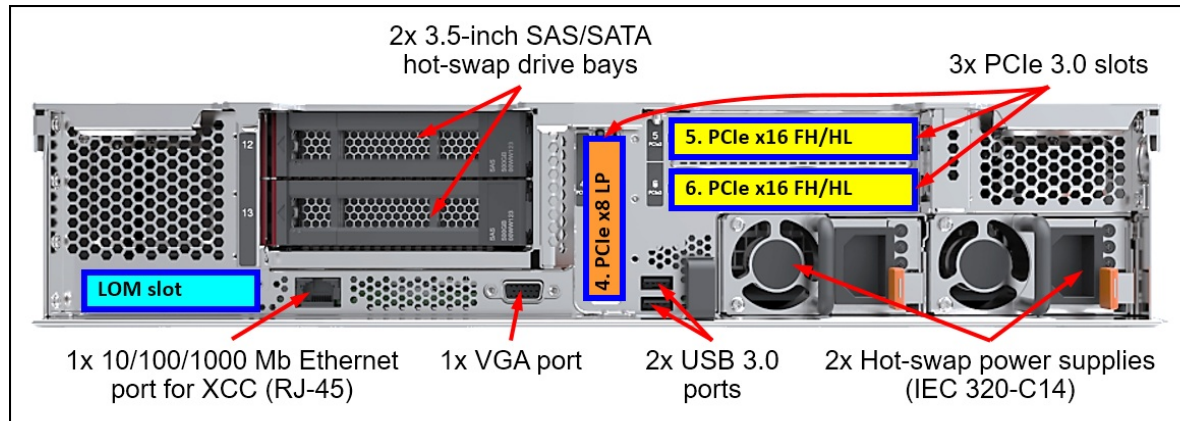


Figure 3. Rear view - ThinkAgile MX3520-H Appliance and MX Certified Node for Hybrid Storage

The rear of the MX systems includes the following components:

- 2x LFF hot-swap drive bays
- Three PCIe expansion slots
- One LOM card slot
- One 1 GbE port for XClarity Controller
- One VGA port
- Two USB 3.0 ports
- Two hot-swap power supplies

## System specifications

The following table lists the system specifications of the MX3520-H Appliance and MX Certified Node.

Table 1. Specifications of the MX3520-H Appliance and MX Certified Node

Attribute	Specification
Machine types	MX Certified Node: 7Z20 MX3520-H Appliance: 7D5R
Form factor	2U Rack-mount.
Processor	Two Intel Xeon Silver, Gold, or Platinum Gen 2 processors.
Chipset	Intel C624.
Memory	24 DIMM slots for TruDDR4 RDIMMs (up to 12 DIMMs per processor; six memory channels per processor with two DIMMs per channel) with support for the following RDIMM capacities: <ul style="list-style-type: none"> <li>• 32 GB Performance+ 2933 MHz.</li> <li>• 8 GB, 16 GB, 32 GB, and 64 GB 2933 MHz.</li> <li>• 16 GB and 32 GB 2666 MHz.</li> </ul>
Memory capacity	Up to 1.5 TB.
Memory protection	Error correction code (ECC), Single Device Data Correction (SDDC; for x4-based memory DIMMs), Adaptive Double Device Data Correction (ADDDC; for x4-based memory DIMMs, requires Intel Xeon Gold or Platinum processors), patrol scrubbing, and demand scrubbing.
Drive bays	<ul style="list-style-type: none"> <li>• 14 LFF hot-swap drive bays: <ul style="list-style-type: none"> <li>◦ 12x 3.5" SAS/SATA (front) + 2x 3.5" SAS/SATA (rear)</li> <li>◦ 8x 3.5" SAS/SATA &amp; 4x 3.5" AnyBay (front) + 2x 3.5" SAS/SATA (rear)</li> </ul> </li> </ul>

Attribute	Specification
Drive capacities	<ul style="list-style-type: none"> <li>● Capacity drives: 6 Gbps NL SATA LFF HDDs up to 14 TB</li> <li>● Cache drives: <ul style="list-style-type: none"> <li>○ 12 Gbps SAS LFF SSDs up to 3.2 TB (2.5" SSD in a 3.5" tray)</li> <li>○ NVMe PCIe 3.0 x4 LFF SSDs up to 6.4 TB (2.5" SSD in a 3.5" tray)</li> </ul> </li> </ul>
Storage controller	1x 430-16i HBA (12 Gbps SAS/6 Gbps SATA non-RAID). 1x Onboard NVMe (non-RAID).
Network interfaces	<ul style="list-style-type: none"> <li>● PCIe adapter ports (required): <ul style="list-style-type: none"> <li>○ 2x or 4x 10/25 GbE SFP28 ports; or</li> <li>○ 1x or 2x 10/40 GbE SFP28 ports; or</li> <li>○ 2x or 4x 100 GbE SFP28 ports.</li> </ul> </li> <li>● LOM ports (optional): 2x or 4x 1 GbE RJ-45, or 1/10 GbE RJ-45, or 10 GbE SFP+ ports.</li> </ul>
Boot drive	2x 480 GB M.2 non-hot-swap SSDs (RAID-1).
I/O expansion slots	<p>Four slots:</p> <ul style="list-style-type: none"> <li>● Slot 4 (Onboard): PCIe 3.0 x8 (for the second 10/25 GbE network adapter)</li> <li>● Slot 5 (Riser Card 2): PCIe 3.0 x16 (for the second 100 GbE network adapter)</li> <li>● Slot 6 (Riser Card 2): PCIe 3.0 x16 (for the first 10/25 GbE or 100 GbE network adapter)</li> <li>● Slot 7 (Onboard): PCIe 3.0 x8 (for an internal storage controller)</li> </ul>
Ports	<ul style="list-style-type: none"> <li>● Front: 1x USB 2.0 port with XClarity Controller access, 1x USB 3.0 port.</li> <li>● Rear: 2x USB 3.0 ports, 1x VGA port, 1x RJ-45 10/100/1000 Mb Ethernet port for systems management.</li> </ul>
Cooling	Six hot-swap system fans with N+1 redundancy.
Power supply	Two redundant hot-swap 1100 W (100-240 V) or 1600 W (200-240 V) High Efficiency Platinum power supplies.
Video	Matrox G200 with 16 MB memory integrated into the XClarity Controller. Maximum resolution is 1920x1200 at 60 Hz with 32 bits per pixel.
Hot-swap parts	SSDs, HDDs, power supplies, and fans.
Systems management	Lenovo XClarity Controller (XCC) Enterprise (Pilot 4 chip), proactive platform alerts, light path diagnostics, Lenovo XClarity Administrator (optional), Lenovo XClarity Integrator for Microsoft System Center (optional), Lenovo XClarity Integrator for Microsoft Admin Center (optional), Lenovo XClarity Energy Manager (optional).
Security features	Power-on password, administrator's password, secure firmware updates, Trusted Platform Module (TPM) 1.2 or 2.0 (configurable UEFI setting).
Software	<p>MX3520-H Appliance: Microsoft Azure Stack HCI operating system is preloaded, with an option to purchase a Windows Server 2019 license (Standard or Datacenter edition) to provide guest OS licenses for virtual machines running in the solution. Standard edition provides 2 guest OS licenses, while Datacenter edition provides unlimited guest OS licenses.</p> <p>MX Certified Node: Microsoft Windows Server 2019 Datacenter edition can be optionally preloaded. Having the Azure Stack HCI operating system preloaded is not currently an option for a Certified Node.</p>

Attribute	Specification
Warranty and support	<p>MX3520-H Appliance: Three-, four-, or five-year customer-replaceable unit and onsite limited hardware warranty with ThinkAgile Advantage Support and selectable service levels: 9x5 next business day (NBD) parts delivered, 9x5 NBD onsite response, 24x7 coverage with 2-hour or 4-hour onsite response, or 6-hour or 24-hour committed repair (select areas). Also available are YourDrive YourData, Premier Support, and Enterprise Software Support.</p> <p>MX Certified Node: Three-, four-, or five-year customer-replaceable unit and onsite limited warranty with selectable service levels: 9x5 coverage with next business day (NBD) parts delivered (base warranty), 9x5 coverage with NBD onsite response (Foundation Service), 24x7 coverage with 4-hour onsite response or 24-hour committed repair (select areas) (Essential Service), or 24x7 coverage with 2-hour onsite response or 6-hour committed repair (select areas) (Advanced Service). Also available are 1-year and 2-year post-warranty extensions, YourDrive YourData, and Enterprise Software Support.</p>
Dimensions	Height: 87 mm (3.4 in.), width: 445 mm (17.5 in.), depth: 720 mm (28.3 in.).
Weight	Maximum configuration: 32 kg (70.5 lb).

## Factory-integrated models

Factory-integrated models of the MX3520-H Appliance and MX Certified Node are configured by using the Lenovo Data Center Solution Configurator (DCSC):

<http://dcsc.lenovo.com>

During the configuration process, you are selecting the base Configure-to-Order (CTO) model first, and then you are selecting components (processors, memory, drives, network adapters, and software) for that model.

The following table lists the base CTO model of the MX systems.

Table 2. Base CTO model

Machine Type/Model	Description
7Z20CTO1WW	ThinkAgile MX Certified Node - Hybrid
7D5RCTO1WW	ThinkAgile MX3520-H Hybrid Appliance

The following table lists the available chassis selection options for the MX systems.

Table 3. Chassis selection options

Feature code	Description
B4E2	ThinkAgile MX Certified Node - Hybrid

The MX systems ship with the following items:

- *Electronic Publications Flyer*
- Tool-less Slide Rail Kit
- Two customer-selected power cables

## Processors

The MX3520-H Appliance and MX Certified Node ship with two processors. The following table lists the processor options that are available for selection.

Table 4. Processors

Feature	Description	Maximum supported	
		MX3520-H	MX 2U Hybrid
<b>Intel Xeon Silver processors</b>			
B4HT	Intel Xeon Silver 4208 8C 85W 2.1GHz Processor	2	2
B4HS	Intel Xeon Silver 4210 10C 85W 2.2GHz Processor	2	2
B7N5	Intel Xeon Silver 4210R 10C 100W 2.4GHz Processor	2	2
B4HR	Intel Xeon Silver 4214 12C 85W 2.2GHz Processor	2	2
B7N6	Intel Xeon Silver 4214R 12C 100W 2.4GHz Processor	2	2
B4HQ	Intel Xeon Silver 4215 8C 85W 2.5GHz Processor	2	2
BAZU	Intel Xeon Silver 4215R 8C 130W 3.2GHz Processor	2	2
B4HP	Intel Xeon Silver 4216 16C 100W 2.1GHz Processor	2	2
<b>Intel Xeon Gold processors</b>			
B4HN	Intel Xeon Gold 5215 10C 85W 2.5GHz Processor	2	2
B4P9	Intel Xeon Gold 5215L 10C 85W 2.5GHz Processor	2	2
B4HM	Intel Xeon Gold 5217 8C 115W 3.0GHz Processor	2	2
B4HL	Intel Xeon Gold 5218 16C 125W 2.3GHz Processor	2	2
BAZS	Intel Xeon Gold 5218R 20C 125W 2.1GHz Processor	2	2
B5S0	Intel Xeon Gold 5218N 16C 110W 2.3GHz Processor	2	2
B4HK	Intel Xeon Gold 5220 18C 125W 2.2GHz Processor	2	2
B7N9	Intel Xeon Gold 5220R 24C 150W 2.2GHz Processor	2	2
B6CV	Intel Xeon Gold 6222V 20C 115W 1.8GHz Processor	2	2
B6CL	Intel Xeon Gold 6226 12C 125W 2.7GHz Processor	2	2
BAZW	Intel Xeon Gold 6226R 16C 150W 2.9GHz Processor	2	2
B4HJ	Intel Xeon Gold 6230 20C 125W 2.1GHz Processor	2	2
BAZX	Intel Xeon Gold 6230R 26C 150W 2.1GHz Processor	2	2
B6CK	Intel Xeon Gold 6234 8C 130W 3.3GHz Processor	2	2
B6CJ	Intel Xeon Gold 6238 22C 140W 2.1GHz Processor	2	2
B6CR	Intel Xeon Gold 6238L 22C 140W 2.1GHz Processor	2	2
BAZL	Intel Xeon Gold 6238R 28C 165W 2.2GHz Processor	2	2
B4HH	Intel Xeon Gold 6240 18C 150W 2.6GHz Processor	2	2
B6CS	Intel Xeon Gold 6240L 18C 150W 2.6GHz Processor	2	2
BAZM	Intel Xeon Gold 6240R 24C 165W 2.4GHz Processor	2	2
B4HG	Intel Xeon Gold 6242 16C 150W 2.8GHz Processor	2	2
B4HE	Intel Xeon Gold 6248 20C 150W 2.5GHz Processor	2	2
B4HC	Intel Xeon Gold 6252 24C 150W 2.1GHz Processor	2	2
B6CU	Intel Xeon Gold 6262V 24C 135W 1.9GHz Processor	2	2
<b>Intel Xeon Platinum processors</b>			
B5RZ	Intel Xeon Platinum 8253 16C 125W 2.2GHz Processor	2	2
B4HB	Intel Xeon Platinum 8260 24C 165W 2.4GHz Processor	2	2
B4P7	Intel Xeon Platinum 8260L 24C 165W 2.4GHz Processor	2	2
B4H8	Intel Xeon Platinum 8276 28C 165W 2.2GHz Processor	2	2

Feature	Description	Maximum supported	
		MX3520-H	MX 2U Hybrid
B4P6	Intel Xeon Platinum 8276L 28C 165W 2.2GHz Processor	2	2



## Memory

The MX3520-H Appliance and MX Certified Node support Lenovo TruDDR4 memory. TruDDR4 memory uses the highest-quality components sourced from Tier 1 DRAM suppliers and only memory that meets strict requirements is selected. It is compatibility tested and tuned to maximize performance and reliability.

The MX systems support up to 24 DIMMs with two processors. Each processor has six memory channels (two integrated memory controllers with three memory channels per memory controller), and there are two DIMMs per channel.

The following rules apply when selecting the memory configuration:

- Up to 1.5 TB (up to 768 GB per processor) of memory capacity is supported.
- RDIMMs with the rated speeds of 2666 MHz or 2933 MHz are supported
- All DIMMs operate at the same speed, which is determined as the lowest value of:
  - DIMM rated speed (2666 MHz or 2933 MHz).
  - Memory speed supported by the specific processor (2400 MHz, 2666 MHz, or 2933 MHz).
  - Memory speed for the selected quantity of DIMMs per channel:
    - One DIMM per channel (1 DPC): 2933 MHz.
    - Two DIMMs per channel (2 DPC)
      - Performance+ DIMMs: 2933 MHz.
      - Other supported DIMMs: 2666 MHz.

**Note:** Maximum memory speed can be achieved when Max performance mode is enabled in UEFI.

- Mixing RDIMMs of different ranks (single- or dual-rank), DRAM chip types (x4 or x8), and capacities (8 GB, 16 GB, 32 GB, or 64 GB) is allowed in the supported quantities that are shown in the Memory options table in this section (excluding Performance+ RDIMMs).
- Mixing RDIMMs of different speeds (2666 MHz and 2933 MHz) is not allowed.
- Performance+ RDIMMs cannot be mixed with other RDIMMs.

The following memory protection technologies are supported:

- ECC
- SDDC (for x4-based memory DIMMs)
- ADDDC (for x4-based memory DIMMs; Gold and Platinum processors only)
- Patrol scrubbing
- Demand scrubbing

The following table lists the memory options that are available for selection.

Table 5. Memory options

Description	Part number	Feature code	Quantity
<b>RDIMMs - 2933 MHz Performance+</b>			
ThinkSystem 32GB TruDDR4 Performance+ 2933MHz (2Rx4 1.2V) RDIMM	None*	B5N7	12, 24
<b>RDIMMs - 2933 MHz</b>			
ThinkSystem 8GB TruDDR4 2933MHz (1Rx8 1.2V) RDIMM	4ZC7A08706	B4H1	8 <sup>^</sup> , 12, 24
ThinkSystem 16GB TruDDR4 2933MHz (1Rx4 1.2V) RDIMM	4ZC7A08707	B4LY	12, 24
ThinkSystem 16GB TruDDR4 2933MHz (2Rx8 1.2V) RDIMM	4ZC7A08708	B4H2	12, 24
ThinkSystem 32GB TruDDR4 2933MHz (2Rx4 1.2V) RDIMM	4ZC7A08709	B4H3	12, 24
ThinkSystem 64GB TruDDR4 2933MHz (2Rx4 1.2V) RDIMM	4ZC7A08710	B4H4	12, 24
<b>RDIMMs - 2666 MHz</b>			
ThinkSystem 16GB TruDDR4 2666 MHz (2Rx8 1.2V) RDIMM	7X77A01303	AUNC	12, 24
ThinkSystem 32GB TruDDR4 2666 MHz (2Rx4 1.2V) RDIMM	7X77A01304	AUND	12, 24

\* Factory-installed only; no field upgrade.

<sup>^</sup> The selection is available in India only.

## Internal storage

The MX3520-H Appliance and MX Certified Node for Hybrid Storage support 14 hot-swap drive bays:

- a. 12x 3.5" SAS/SATA (front) + 2x 3.5" SAS/SATA (rear)
- b. 8x 3.5" SAS/SATA & 4x 3.5" AnyBay (front) + 2x 3.5" SAS/SATA (rear)

In addition, the MX systems support two internal M.2 SATA SSDs for the Windows Server boot volume.

The following figure shows the internal drive bay configurations.

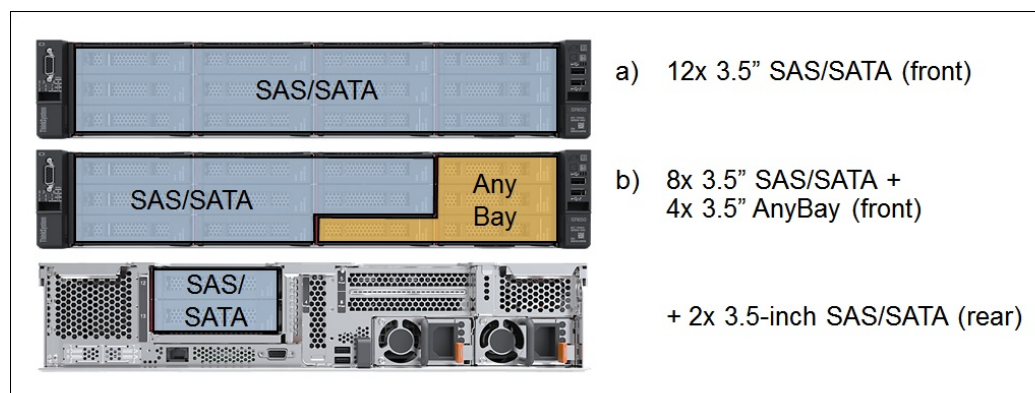


Figure 4. Drive bay configurations

The following table lists the internal storage options.

Table 6. Internal storage options

Description	Feature code	Quantity (min / max)
Factory-installed backplane kits		
ThinkSystem SR550/SR650 3.5" SATA/SAS 12-Bay Backplane Kit	AUR9	0 / 1
ThinkSystem SR650 3.5" AnyBay 12-Bay Backplane Kit	AUR8	0 / 1
ThinkSystem SR590/SR650 3.5" Rear HDD Kit	AURZ	1 / 1
M.2 enablement kits		
ThinkSystem M.2 with Mirroring Enablement Kit	AUMV	1 / 1

**Configuration notes:**

- The AnyBay 12-Bay Backplane (AUR8) is required for selection if the NVMe PCIe SSDs are used as cache drives. If the NVMe PCIe SSDs are not used, the SATA/SAS 12-Bay Backplane (AUR9) must be selected.
- The Rear HDD Kit (AURZ) is pre-selected, and it cannot be removed from the configuration.
- The M.2 with Mirroring Enablement Kit (AUMV) is connected to the Intel PCH via the PCIe link, and the kit supports two M.2 SATA SSDs configured in a RAID-1 drive group for a boot volume.

The following table lists the storage controllers for internal storage.

Table 7. Controllers for internal storage

Description	Feature code	Quantity
12 Gb SAS/SATA non-RAID HBA		
ThinkSystem 430-16i SAS/SATA 12Gb HBA	AUNM	1
NVMe PCIe interface (non-RAID)		
Onboard NVMe interface (4-port)	None	1

**Configuration notes:**

- The 430-16i SAS/SATA HBA is connected to the front and rear drive bays, and it occupies the PCIe x8 slot 7 on the system board.
- The onboard NVMe interface provides 4x PCIe 3.0 x4 ports for JBOD (non-RAID) connectivity to NVMe PCIe SSDs in the AnyBay drive bays.

The following table lists internal storage configurations with the SAS/SATA and AnyBay backplanes.

Table 8. Internal storage configurations: 12 LFF front and 2 LFF rear drive bays

Hot-swap drive bay configuration	Backplane kit type and quantity			Storage controller type and quantity*
	12x3.5" SATA/SAS	12x3.5" Any Bay	2x3.5" Rear HDD	
12x 3.5" SAS/SATA (front) + 2x 3.5" SAS/SATA (rear)	1	0	1	1x 430-16i HBA (14)
8x 3.5" SAS/SATA (front) + 4x 3.5" AnyBay (front) + 2x 3.5" SAS/SATA (rear)	0	1	1	1x 430-16i HBA (14) + 1x Onboard NVMe (4)

\* The number in brackets (x) specifies the quantity of drive bays connected to each of the controllers.

## Drives for internal storage

The following tables list the hard disk drive and solid-state drive options for the internal disk storage of the server.

3.5-inch hot-swap drives:

- [3.5-inch hot-swap 12 Gb SAS HDDs](#)
- [3.5-inch hot-swap 6 Gb SATA HDDs](#)
- [3.5-inch hot-swap 12 Gb SAS SSDs](#)
- [3.5-inch hot-swap PCIe 3.0 NVMe SSDs](#)

M.2 drives:

- [M.2 SATA drives](#)

**M.2 drive support:** The use of M.2 drives requires an additional adapter as described in the [Internal storage](#) section.

Table 9. 3.5-inch hot-swap 12 Gb SAS HDDs

Part number	Feature	Description	Maximum supported
3.5-inch hot-swap HDDs - 12 Gb NL SAS			
7XB7A00043	AUU6	ThinkSystem 3.5" 4TB 7.2K SAS 12Gb Hot Swap 512n HDD	10
7XB7A00044	AUU7	ThinkSystem 3.5" 6TB 7.2K SAS 12Gb Hot Swap 512e HDD	10
7XB7A00045	B0YR	ThinkSystem 3.5" 8TB 7.2K SAS 12Gb Hot Swap 512e HDD	10
7XB7A00046	AUUG	ThinkSystem 3.5" 10TB 7.2K SAS 12Gb Hot Swap 512e HDD	10
7XB7A00067	B117	ThinkSystem 3.5" 12TB 7.2K SAS 12Gb Hot Swap 512e HDD	10
4XB7A13906	B496	ThinkSystem 3.5" 14TB 7.2K SAS 12Gb Hot Swap 512e HDD	10

Table 10. 3.5-inch hot-swap 6 Gb SATA HDDs

Part number	Feature	Description	Maximum supported
3.5-inch hot-swap HDDs - 6 Gb NL SATA			
7XB7A00051	AUU8	ThinkSystem 3.5" 4TB 7.2K SATA 6Gb Hot Swap 512n HDD	10
7XB7A00052	AUUA	ThinkSystem 3.5" 6TB 7.2K SATA 6Gb Hot Swap 512e HDD	10
7XB7A00053	AUU9	ThinkSystem 3.5" 8TB 7.2K SATA 6Gb Hot Swap 512e HDD	10
7XB7A00054	AUUB	ThinkSystem 3.5" 10TB 7.2K SATA 6Gb Hot Swap 512e HDD	10
7XB7A00068	B118	ThinkSystem 3.5" 12TB 7.2K SATA 6Gb Hot Swap 512e HDD	10
4XB7A13907	B497	ThinkSystem 3.5" 14TB 7.2K SATA 6Gb Hot Swap 512e HDD	10

Table 11. 3.5-inch hot-swap 12 Gb SAS SSDs

Part number	Feature	Description	Maximum supported
3.5-inch hot-swap SSDs - 12 Gb SAS - Performance (10+ DWPD)			
4XB7A10234	B4Y8	ThinkSystem 3.5" SS530 800GB Performance SAS 12Gb Hot Swap SSD	4
4XB7A10235	B4Y9	ThinkSystem 3.5" SS530 1.6TB Performance SAS 12Gb Hot Swap SSD	4
4XB7A10236	B4YA	ThinkSystem 3.5" SS530 3.2TB Performance SAS 12Gb Hot Swap SSD	4
3.5-inch hot-swap SSDs - 12 Gb SAS - Mainstream (3-5 DWPD)			
4XB7A17066	B8HT	ThinkSystem 3.5" PM1645a 800GB Mainstream SAS 12Gb Hot Swap SSD	4
4XB7A17043	B8JN	ThinkSystem 3.5" PM1645a 1.6TB Mainstream SAS 12Gb Hot Swap SSD	4
4XB7A17067	B8JK	ThinkSystem 3.5" PM1645a 3.2TB Mainstream SAS 12Gb Hot Swap SSD	4

Table 12. 3.5-inch hot-swap PCIe 3.0 NVMe SSDs

Part number	Feature	Description	Maximum supported
3.5-inch SSDs - PCIe 3.0 NVMe - Mainstream (3-5 DWPD)			
4XB7A13944	B58C	ThinkSystem 3.5" Intel P4610 1.6TB Mainstream NVMe PCIe3.0 x4 Hot Swap SSD	4
4XB7A13945	B58D	ThinkSystem 3.5" Intel P4610 3.2TB Mainstream NVMe PCIe3.0 x4 Hot Swap SSD	4
4XB7A13946	B58E	ThinkSystem 3.5" Intel P4610 6.4TB Mainstream NVMe PCIe3.0 x4 Hot Swap SSD	4

**Note:** NVMe PCIe SSDs support surprise hot removal and hot insertion, provided the operating system supports PCIe SSD hot-swap.

Table 13. M.2 SATA drives

Part number	Feature	Description	Maximum supported
M.2 SSDs - 6 Gb SATA - Entry (<3 DWPD)			
7SD7A05703	B11V	ThinkSystem M.2 5100 480GB SATA 6Gbps Non-Hot Swap SSD	2
4XB7A17073	B919	ThinkSystem M.2 5300 480GB SATA 6Gbps Non-Hot Swap SSD	2

**Configuration notes:**

- A minimum of four and a maximum of ten capacity HDDs must be selected. All HDDs must be of the same type and capacity.
- A minimum of two and a maximum of four cache SSDs must be selected. All SSDs must be of the same model and capacity.

**I/O expansion**

The MX systems provide four PCIe slots: one slot on the system planar that is dedicated to an internal storage controller, one regular PCIe slot on the system planar, and two PCIe slots on the Riser Card 2.

The slot form factors are as follows:

- Slot 4 (Onboard): PCIe 3.0 x8; low profile (for the second 10/25 GbE network adapter)
- Slot 5 (Riser Card 2): PCIe 3.0 x16; full-height, half-length (for the second 100 GbE network adapter)
- Slot 6 (Riser Card 2): PCIe 3.0 x16; full-height, half-length (for the first 10/25 GbE or 100 GbE network adapter)
- Slot 7 (Onboard): PCIe 3.0 x8 (dedicated to an internal storage controller)

The locations of the PCIe slots are shown in the [Components and connectors](#).

The following table lists the PCIe Riser Card 2 that is derived by the configurator in all configurations.

Table 14. PCIe Riser Card 2

Description	Feature code	Quantity
ThinkSystem 2U (x16/x8)/(x16/x16) PCIe FH Riser 2 Kit	AURC	1

**Network connectivity**

The MX3520-H Appliance and MX Certified Node provide two- or four-port 10/25 GbE SFP28 or 100 GbE QSFP28, or one- or two-port 10/40 GbE QSFP+ network connectivity with the PCIe Ethernet adapters. Optionally, a LOM card can be selected to provide two- or four-port 1 GbE RJ-45, or 1/10 GbE RJ-45, or 10 GbE SFP+ external network connectivity to the cluster.

The following table lists the network adapters available for selection.

Table 15. Network adapter selection options

Description	Feature code	Quantity (min / max)
1 GbE RJ-45 ports		
ThinkSystem 1Gb 2-port RJ-45 LOM	AUKG	0 / 1
ThinkSystem 1Gb 4-port RJ-45 LOM	AUKH	0 / 1

Description	Feature code	Quantity (min / max)
<b>1/10 GbE RJ-45 ports</b>		
ThinkSystem 10Gb 2-port Base-T LOM	AUKL	0 / 1
ThinkSystem 10Gb 4-port Base-T LOM	AUKM	0 / 1
<b>10 GbE SFP+ ports</b>		
ThinkSystem 10Gb 2-port SFP+ LOM	AUKJ	0 / 1
ThinkSystem 10Gb 4-port SFP+ LOM	AUKK	0 / 1
<b>10/25 GbE SFP28 ports</b>		
Mellanox ConnectX-4 Lx 10/25GbE SFP28 2-Port PCIe Ethernet Adapter	AUAJ	1 / 2
QLogic QL41262 10/25GbE SFP28 2-Port PCIe Ethernet Adapter	B21R	1 / 2
<b>40 GbE network adapters (PCIe 3.0 x8)</b>		
Mellanox ConnectX-4 Lx 1x40GbE QSFP+ Adapter	ATRN	1 / 2
<b>100 GbE network adapters (PCIe 3.0 x16)</b>		
Mellanox ConnectX-4 1x100GbE/EDR IB QSFP28 VPI Adapter	ASWQ	1 / 2
Mellanox ConnectX-4 2x100GbE/EDR IB QSFP28 VPI Adapter	ATRP	1 / 2
Mellanox ConnectX-6 HDR100 QSFP56 1-port PCIe InfiniBand Adapter	B4R9	1 / 2
Mellanox ConnectX-6 HDR100 QSFP56 2-port PCIe InfiniBand Adapter	B4RA	1 / 2

#### Configuration notes:

- A minimum of one and a maximum of two PCIe network adapters can be selected. If two PCIe network adapters are used, they must be of the same model.
- The selection of a LOM card is optional (a LOM card is not supported for RDMA storage traffic and can be used only for the external network connectivity to the cluster).
- A two-node cluster supports direct node-to-node (no external switch is needed) or switched (an external switch is needed) network connectivity with the network ports on the PCIe network adapters. For three or more nodes, an external switch is required.
- Supported transceivers or DAC cables should be purchased for the SFP+ and SFP28 network adapter ports, supported active optical cables should be purchased for the QSFP28 ports, and UTP Category 6 or Category 5e cables should be purchased for the 10 GbE (Cat6) or 1 GbE (Cat5e or Cat6) RJ-45 network adapter ports. The maximum number of cables that are supported per adapter equals the quantity of the adapter ports, and all adapter ports must have the same type of the cable selected. See the product guide for the adapter for the list of supported transceivers and cables.

For more information, see the list of Product Guides in the Ethernet Adapters category:

<http://lenovopress.com/servers/options/ethernet#rt=product-guide>

## GPU adapters

The MX3520-H Appliance and MX Certified Node support graphics processing units (GPUs) listed in the following table.

Table 16. GPU adapters

Feature code	Description	Maximum quantity
PCIe 3.0 x16 single-wide GPU adapters		
B4YB	ThinkSystem NVIDIA Tesla T4 16GB PCIe Passive GPU	5
B32D	ThinkSystem NVIDIA Tesla V100 FHHL 16GB PCIe GPU	3
PCIe 3.0 x16 double-wide GPU adapters		
B228	ThinkSystem AMD Radeon Instinct MI25 16GB PCIe Passive GPU	2
B1JY	ThinkSystem NVIDIA Tesla V100 16GB PCIe Passive GPU	2
B34S	ThinkSystem NVIDIA Tesla V100 32GB PCIe Passive GPU	2
BB2E	ThinkSystem NVIDIA Tesla V100S 32GB PCIe Passive GPU	2

Refer to the ThinkSystem SR650 product guide for the configuration rules for GPU adapters:

<https://lenovopress.com/lp1050-thinksystem-sr650-server-xeon-sp-gen2#gpu-adapters>

## Power supplies and cables

The MX3520-H Appliance and MX Certified Node ship with two 1100 W (230V/115V) or 1600 W (230V) Platinum hot-swap power supplies listed in the following table.

Table 17. Power supplies

Description	Feature code	Quantity
ThinkSystem 1100W (230V/115V) Platinum Hot-Swap Power Supply	AVWF	2
ThinkSystem 1600W (230V) Platinum Hot-Swap Power Supply	AVWG	2

### Configuration notes:

- Two power supplies are required per system.
- The power supplies support AC (Worldwide) and HVDC (China only) power sources.

The MX3520-H Appliance and MX Certified Node ship with two customer-configured power cords. The following table lists the rack power cables and line cords that can be ordered.

Table 18. Power cables

Description	Part number	Feature code
Rack power cables		
1.0m, 10A/125-250V, C13 to IEC 320-C14 Rack Power Cable	00Y3043	A4VP
1.0m, 13A/100-250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08367	B0N5
1.2m, 16A/100-250V, 2 Short C13s to Short C20 Rack Power Cable	47C2491	A3SW
1.5m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	39Y7937	6201
1.5m, 13A/100-250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08368	B0N6



Description	Part number	Feature code
2.0m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08365	B0N4
2.0m, 13A/125V-10A/250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08369	6570
2.5m, 16A/100-250V, 2 Long C13s to Short C20 Rack Power Cable	47C2492	A3SX
2.8m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08366	6311
2.8m, 13A/125V-10A/250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08370	6400
2.8m, 10A/100-250V, C13 to IEC 320-C20 Rack Power Cable	39Y7938	6204
2.8m, 16A/100-250V, 2 Short C13s to Long C20 Rack Power Cable	47C2493	A3SY
4.1m, 16A/100-250V, 2 Long C13s to Long C20 Rack Power Cable	47C2494	A3SZ
4.3m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	39Y7932	6263
4.3m, 13A/125V-10A/250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08371	6583
<b>Line cords</b>		
Argentina 2.8m, 10A/250V, C13 to IRAM 2073 Line Cord	39Y7930	6222
Argentina 4.3m, 10A/250V, C13 to IRAM 2073 Line Cord	81Y2384	6492
Australia/New Zealand 2.8m, 10A/250V, C13 to AS/NZS 3112 Line Cord	39Y7924	6211
Australia/New Zealand 4.3m, 10A/250V, C13 to AS/NZS 3112 Line Cord	81Y2383	6574
Brazil 2.8m, 10A/250V, C13 to NBR 14136 Line Cord	69Y1988	6532
Brazil 4.3m, 10A/250V, C13 to NBR14136 Line Cord	81Y2387	6404
China 2.8m, 10A/250V, C13 to GB 2099.1 Line Cord	39Y7928	6210
China 4.3m, 10A/250V, C13 to GB 2099.1 Line Cord	81Y2378	6580
Denmark 2.8m, 10A/250V, C13 to DK2-5a Line Cord	39Y7918	6213
Denmark 4.3m, 10A/250V, C13 to DK2-5a Line Cord	81Y2382	6575
Europe 2.8m, 10A/250V, C13 to CEE7-VII Line Cord	39Y7917	6212
Europe 4.3m, 10A/250V, C13 to CEE7-VII Line Cord	81Y2376	6572
India 2.8m, 10A/250V, C13 to IS 6538 Line Cord	39Y7927	6269
India 4.3m, 10A/250V, C13 to IS 6538 Line Cord	81Y2386	6567
Israel 2.8m, 10A/250V, C13 to SI 32 Line Cord	39Y7920	6218
Israel 4.3m, 10A/250V, C13 to SI 32 Line Cord	81Y2381	6579
Italy 2.8m, 10A/250V, C13 to CEI 23-16 Line Cord	39Y7921	6217
Italy 4.3m, 10A/250V, C13 to CEI 23-16 Line Cord	81Y2380	6493
Japan 2.8m, 12A/125V, C13 to JIS C-8303 Line cord	46M2593	A1RE
Japan 2.8m, 12A/250V, C13 to JIS C-8303 Line Cord	4L67A08357	6533
Japan 4.3m, 12A/125V, C13 to JIS C-8303 Line Cord	39Y7926	6335
Japan 4.3m, 12A/250V, C13 to JIS C-8303 Line Cord	4L67A08362	6495
Korea 2.8m, 12A/250V, C13 to KS C8305 Line Cord	39Y7925	6219
Korea 4.3m, 12A/250V, C13 to KS C8305 Line Cord	81Y2385	6494
South Africa 2.8m, 10A/250V, C13 to SABS 164 Line Cord	39Y7922	6214
South Africa 4.3m, 10A/250V, C13 to SABS 164 Line Cord	81Y2379	6576
Switzerland 2.8m, 10A/250V, C13 to SEV 1011-S24507 Line Cord	39Y7919	6216
Switzerland 4.3m, 10A/250V, C13 to SEV 1011-S24507 Line Cord	81Y2390	6578
Taiwan 2.8m, 10A/125V, C13 to CNS 10917-3 Line Cord	23R7158	6386
Taiwan 2.8m, 10A/250V, C13 to CNS 10917-3 Line Cord	81Y2375	6317

Description	Part number	Feature code
Taiwan 2.8m, 15A/125V, C13 to CNS 10917-3 Line Cord	81Y2374	6402
Taiwan 4.3m, 10A/125V, C13 to CNS 10917-3 Line Cord	4L67A08363	AX8B
Taiwan 4.3m, 10A/250V, C13 to CNS 10917-3 Line Cord	81Y2389	6531
Taiwan 4.3m, 15A/125V, C13 to CNS 10917-3 Line Cord	81Y2388	6530
United Kingdom 2.8m, 10A/250V, C13 to BS 1363/A Line Cord	39Y7923	6215
United Kingdom 4.3m, 10A/250V, C13 to BS 1363/A Line Cord	81Y2377	6577
United States 2.8m, 10A/125V, C13 to NEMA 5-15P Line Cord	90Y3016	6313
United States 2.8m, 10A/250V, C13 to NEMA 6-15P Line Cord	46M2592	A1RF
United States 2.8m, 13A/125V, C13 to NEMA 5-15P Line Cord	00WH545	6401
United States 4.3m, 10A/125V, C13 to NEMA 5-15P Line Cord	4L67A08359	6370
United States 4.3m, 10A/250V, C13 to NEMA 6-15P Line Cord	4L67A08361	6373
United States 4.3m, 13A/125V, C13 to NEMA 5-15P Line Cord	4L67A08360	AX8A

**Configuration note:** If the 1100 W AC power supplies are connected to a low-voltage power source (100 - 125 V), the only supported power cables are those that are rated above 10 A; cables that are rated at 10 A are not supported.

## Rack installation

The MX3520-H Appliance and MX Certified Node ship with a rail kit shown in the following table.

Table 19. Rack installation

Description	Feature code	Quantity
ThinkSystem Tool-less Slide Rail (4-post)	AXCA	1

The following table summarizes the rail kit features and specifications.

Table 20. Rail kit features and specifications summary

Feature	Tool-less Slide Rail
Rail length	730 mm (28.74 in.)
Rail type	Full-out slide (ball bearing)
Tool-less installation	Yes
In-rack server maintenance	Yes
1U PDU support	Yes
0U PDU support	Limited*
Rack type	IBM and Lenovo 4-post, IEC standard-compliant
Mounting holes	Square or round
Mounting flange thickness	2 mm (0.08 in.) – 3.3 mm (0.13 in.)
Distance between front and rear mounting flanges <sup>^</sup>	609.6 mm (24 in.) – 863.6 mm (34 in.)

\* If a 0U PDU is used, the rack cabinet must be at least 1100 mm (43.31 in.) deep.

<sup>^</sup> Measured when mounted on the rack, from the front surface of the front mounting flange to the rear most point of the rail.

## Software

The ThinkAgile MX3520-H Appliance includes the preloaded Azure Stack HCI operating system only and requires activation via a CSP such as Lenovo Cloud Marketplace, with the option to purchase a Windows Server 2019 Datacenter license if unlimited guest OS VMs are desired.

The ThinkAgile MX Certified Node can optionally have Windows Server 2019 Datacenter preinstalled. Customers can use existing Windows Server 2019 Datacenter software licenses, or they can purchase new software licenses from Lenovo or Microsoft. If the licenses are purchased from Lenovo, Windows Server 2019 can be factory-installed or shipped in the box with the Certified Node for the installation at the customer site.

The following table lists the Windows Server 2019 Datacenter software options that are available for selection from Lenovo

Table 21. Windows Server Datacenter software selection options

Feature code	Description
Windows Server 2019 Datacenter (Factory installed)	
B6P2	Windows Server 2019 Datacenter - English
B6P3	Windows Server 2019 Datacenter - Japanese
B6P4	Windows Server 2019 Datacenter - Simplified Chinese
Windows Server 2019 Datacenter (Not preinstalled)	
B6NY	Windows Server 2019 Datacenter - Multilanguage
B6NZ	Windows Server 2019 Datacenter - Japanese
B6P1	Windows Server 2019 Datacenter - Traditional Chinese
B6P0	Windows Server 2019 Datacenter - Simplified Chinese

### Configuration notes:

- The selection of Windows Server software licenses is optional.
- The quantity of core-based licenses should be sufficient to cover all processor cores in the system.

## Systems management

The MX3520-H Appliance and MX Certified Node support the following systems management tools:

- Lenovo XClarity Controller
- Light path diagnostics
- Lenovo XClarity Administrator and XClarity Pro
- Lenovo XClarity Integrator for Microsoft Admin Center
- Lenovo XClarity Integrator for Microsoft System Center
- Lenovo XClarity Energy Manager

### Lenovo XClarity Controller

The MX systems contain Lenovo XClarity Controller (XCC) Enterprise, which provides advanced service-processor control, monitoring, and alerting functions.

XClarity Controller Enterprise offers the following capabilities:

- Gathering and viewing system information and inventory
- Monitoring system status and health
- Alerting and notifications
- Event logging

- Syslog alerting
- Configuring security
- Updating system firmware
- Real-time power usage monitoring
- Displaying graphics for real-time and historical power usage data and temperature
- Capping power usage
- Remotely controlling power (Power on, Power off, Restart)

The XClarity Controller provides remote system management through the following interfaces:

- Intelligent Platform Management Interface (IPMI) Version 2.0
- Simple Network Management Protocol (SNMP) Version 3
- Common Information Model (CIM)
- Data Center Manageability Interface (DCMI) Version 1.5
- Redfish REpresentational State Transfer (REST) API
- Web browser with HTML5 support
- Command-line interface
- Virtual Operator Panel with XClarity Mobile App via the front USB port with XClarity Controller access

Virtual Operator Panel provides quick access to system status, firmware, network, health, and alerts information. With proper authentication, it also allows to configure systems management and network settings and to control system power (Power on, Power off, Restart). The Virtual Operator Panel can be accessed from the XClarity Mobile App running on the Android or iOS mobile device that is connected to the front USB port with XClarity Controller access (See [Components and connectors](#) ).

### Light path diagnostics

The MX systems include basic light path diagnostics, which provides the system LEDs on the front of the node and the LEDs near the monitored components (for example, the DIMM error LEDs on the system board).

### Lenovo XClarity Administrator and XClarity Pro

Lenovo XClarity Administrator is a centralized systems management solution that helps administrators deliver infrastructure faster. This solution integrates easily with Lenovo x86 servers, ThinkAgile MX certified nodes, RackSwitch switches, and DS Series storage, providing automated agent-less discovery, monitoring, firmware updates, and configuration management across multiple systems.

Lenovo XClarity Administrator is an optional software component which can be downloaded and used at no charge to discover and monitor the systems and manage firmware upgrades for them.

If software support is required for XClarity Administrator and XClarity Integrator for System Center, Lenovo XClarity Pro software subscription should be ordered. Lenovo XClarity Pro is licensed on a per managed system basis, that is, each managed Lenovo system requires a license.

The following table lists the Lenovo XClarity Pro license options available for selection.

Table 22. Lenovo XClarity Pro licenses

Description	Feature code
Lenovo XClarity Pro, per Managed Server w/3 Yr SW S&S	B3XS
Lenovo XClarity Pro, per Managed Server w/5 Yr SW S&S	B3XT

Lenovo XClarity Administrator offers the following standard features that are available at no charge:

- Auto-discovery and monitoring of Lenovo x86 servers, appliances, certified nodes, RackSwitch switches, Flex System chassis, and DM/DE/DS Series storage systems
- Firmware updates and compliance enforcement
- External alerts and notifications via SNMP traps, syslog remote logging, and e-mail
- Secure connections to managed endpoints
- NIST 800-131A or FIPS 140-2 compliant cryptographic standards between the management solution and managed endpoints
- Integration into existing higher-level management systems such as cloud automation and orchestration tools through REST APIs, providing extensive external visibility and control over hardware resources
- An intuitive, easy-to-use GUI
- Scripting with Windows PowerShell, providing command-line visibility and control over hardware resources

Lenovo XClarity Administrator offers the following premium features that require an optional Pro license:

- Pattern-based configuration management that allows to define configurations once and apply repeatedly without errors when deploying new systems or redeploying existing systems without disrupting the fabric
- Bare-metal deployment of operating systems and hypervisors to streamline infrastructure provisioning

For more information, refer to the Lenovo XClarity Administrator Product Guide:

<http://lenovopress.com/tips1200>

### **Lenovo XClarity Integrator for Microsoft Admin Center**

Lenovo XClarity Integrator for Microsoft Admin Center is a software plug-in module for Lenovo XClarity Administrator that provides customers a smooth and seamless management experience across Windows Server hyperconverged and physical infrastructure in a single unified user interface.

Lenovo XClarity Integrator for Admin Center offers the following features:

- Monitoring health status of cluster hardware and generating alerts
- Collecting inventory, including available firmware updates
- Managing firmware updates for systems and clusters
- Performing remote management, including remote power on/off and remote control.

Lenovo XClarity Integrator for Admin Center can be downloaded and used at no charge. For more information, refer to the Lenovo XClarity Integrator for Microsoft System Center web page:

<http://support.lenovo.com/us/en/solutions/ht507549>

## Lenovo XClarity Integrator for Microsoft System Center

Lenovo XClarity Integrator for Microsoft System Center is a software plug-in module for Lenovo XClarity Administrator that allows customers to integrate the management features of the Lenovo x86 servers, appliances, and certified nodes with Microsoft System Center.

Lenovo XClarity Integrator for System Center offers the following features:

- Ability to discover, manage, and monitor Lenovo hardware from the virtualization management tool
- Deployment of firmware updates and configuration patterns from the virtualization management tool
- Non-disruptive system maintenance in clustered environments that reduces workload downtime by dynamically migrating workloads from affected hosts during rolling system updates or reboots
- Greater service level uptime and assurance in clustered environments during unplanned hardware events by dynamically triggering workload migration from impacted hosts when impending hardware failures are predicted

Lenovo XClarity Integrator for System Center can be downloaded and used at no charge. For more information, refer to the Lenovo XClarity Integrator for Microsoft System Center web page:

<http://support.lenovo.com/us/en/solutions/lvno-msuim>

## Lenovo XClarity Energy Manager

Lenovo XClarity Energy Manager provides a stand-alone, web-based agent-less power management console that provides real time data and enables you to observe, plan and manage power and cooling for Lenovo servers, appliances, and certified nodes. Using built-in intelligence, it identifies system power consumption trends and ideal power settings and performs cooling analysis so that you can define and optimize power-saving policies.

Lenovo XClarity Energy Manager offers the following capabilities:

- Monitors room, row, rack, and device levels in the data center
- Reports vital system information, such as power, temperature and resource utilization
- Monitors inlet temperature to locate hot spots, reducing the risk of data or device damage
- Provides finely-grained controls to limit platform power in compliance with IT policy
- Generates alerts when a user-defined threshold is reached

Lenovo XClarity Energy Manager is an optional software component that is licensed on a per managed node basis, that is, each managed system requires a license. The 1-node Energy Manager license is included in the XClarity Controller Enterprise upgrade.

For more information, refer to the Lenovo XClarity Energy Manager web page:

<http://datacentersupport.lenovo.com/us/en/solutions/lvno-ixem>

## Physical specifications

The MX3520-H Appliance and MX Certified Node have the following dimensions and weight (approximate):

- Height: 87 mm (3.4 in.)
- Width: 445 mm (17.5 in.)
- Depth: 720 mm (28.3 in.)
- Weight (maximum): 32 kg (70.5 lb)

## Operating environment

The MX3520-H Appliance and MX Certified Node comply with ASHRAE class A2 specifications. The system performance might be impacted when the operating temperature is outside the ASHRAE A2 specifications.

The MX systems are supported in the following environment:

- Air temperature:
  - Operating: ASHRAE Class A2: 10 °C - 35 °C (50 °F - 95 °F); for altitudes above 900 m (2,953 ft), decrease the maximum ambient temperature by 1 °C for every 300-m (984-ft) increase in altitude
  - Non-operating: 5 °C - 45 °C (41 °F - 113 °F)
  - Storage: -40 °C - +60 °C (-40 °F - 140 °F)
- Maximum altitude: 3,050 m (10,000 ft)
- Humidity:
  - Operating: ASHRAE Class A2: 8% - 80% (non-condensing); maximum dew point: 21 °C (70 °F)
  - Storage: 8% - 90% (non-condensing)
- Electrical:
  - 100 - 127 (nominal) V AC; 50 Hz / 60 Hz (1100 W power supplies)
  - 200 - 240 (nominal) V AC; 50 Hz / 60 Hz
  - 180 - 300 V DC (supported in China only)
- Acoustics (maximum configuration, operating): 6.2 bels
- Vibration:
  - Operating: 0.21 G rms at 5 Hz to 500 Hz for 15 minutes across 3 axes
  - Non-operating: 1.04 G rms at 2 Hz to 200 Hz for 15 minutes across 6 surfaces
- Shock:
  - Operating: 15 G for 3 milliseconds in each direction (positive and negative X, Y, and Z axes)
  - Non-operating:
    - 12 kg - 22 kg: 50 G for 152 in./sec velocity change across 6 surfaces
    - 23 kg - 31 kg: 35 G for 152 in./sec velocity change across 6 surfaces

The following table lists the maximum system power load, rated inlet current, and system heat output based on the power supply and source voltage.

Table 23. Rated system power, inlet current, and system heat output

Power supply	Source voltage	Maximum power load per system (two power supplies)	Rated current per inlet	System heat output
1100 W Platinum	100 - 127 V AC	1382 W	12 A	4715 BTU/hour
	200 - 240 V AC	1408 W	6 A	4804 BTU/hour
	180 - 300 V DC	1408 W	5.1 A	4804 BTU/hour
1600 W Platinum	200 - 240 V AC	2068 W	8.7 A	7056 BTU/hour
	180 - 300 V DC	2024 W	7.3 A	6906 BTU/hour

## Regulatory compliance

The MX3520-H Appliance and MX Certified Node conform to the following regulations:

- United States: FCC Part 15, Class A; UL 60950-1
- Canada: ICES-003/NMB-03, Class A; CAN/CSA-C22.2 60950-1
- Mexico: NOM-19
- Argentina: IEC60950-1
- European Union: CE Mark (EN55022 Class A, IEC/EN60950-1, EN55024, EN61000-3-2, EN61000-3-3)
- Germany: TUV-GS (IEC/EN 60950-1, EK1-ITB2000)
- Russia, Kazakhstan, Belarus: EAC (TR CU 004/2011, TR CU 020/2011)
- China: CCC GB4943.1, GB9254 Class A, GB17625.1
- India: BIS
- Japan: VCCI, Class A
- Taiwan: BSMI CNS13438, Class A; CNS14336-1
- Korea: KN22, Class A; KN24
- Australia/New Zealand: AS/NZS CISPR 22 Class A
- Reduction of Hazardous Substances (ROHS)
- Energy Star 3.0

## Warranty and support

The ThinkAgile MX3520-H Appliances can be configured with a three-, four-, or five-year hardware warranty with 24x7 ThinkAgile Advantage Single Point of Support (Lenovo appliance hardware and Microsoft software) and various levels of coverage with a well-defined scope of services, including service hours, response time, term of service, and service agreement terms and conditions.

For more information refer to the Lenovo Support Plan - MX Appliance support plan <https://support.lenovo.com/us/en/solutions/HT511522>

The ThinkAgile MX Certified Nodes can be configured with a three-, four-, or five-year hardware warranty and various levels of service coverage with a well-defined scope of services, including service hours, response time, term of service, and service agreement terms and conditions.

The base warranty provides 9x5 Next Business Day response with parts delivered. Lenovo's additional support services provide a sophisticated, unified support structure for a customer's data center, with an experience consistently ranked number one in customer satisfaction worldwide.

The following Lenovo support services are available for selection:

- **Warranty service level upgrades (Preconfigured Support)** are available to meet the on-site response time targets that match the criticality of customer's systems:
  - 3, 4, or 5 years of service coverage.
  - 1-year or 2-year post-warranty extensions.
  - **Foundation Service:** 9x5 service coverage with next business day onsite response, with optional YourDrive YourData.
  - **Essential Service:** 24x7 service coverage with 4-hour onsite response or 24-hour committed repair (available only in select regions), bundled with YourDrive YourData.
  - **Advanced Service:** 24x7 service coverage with 2-hour onsite response or 6-hour committed repair (available only in select regions), bundled with YourDrive YourData.
- **Managed Services**  
Lenovo Managed Services provide continuous 24x7 remote monitoring (plus 24x7 call center availability) and proactive management of a customer's data center using state of the art tools, systems, and practices by a team of highly skilled and experienced Lenovo services professionals.



Quarterly reviews check error logs, verify firmware and operating system device driver levels, and software as needed. Lenovo will also maintain records of latest patches, critical updates, and firmware levels, to ensure customer's systems are providing business value through optimized performance.

- **Technical Account Management (TAM)**

A Lenovo Technical Account Manager helps customers optimize operations of their data centers based on a deep understanding of customer's business. Customers gain direct access to a Lenovo TAM, who serves as their single point of contact to expedite service requests, provide status updates, and furnish reports to track incidents over time. Also, a TAM helps proactively make service recommendations and manage service relationship with Lenovo to make certain that customer's needs are met.

- **Enterprise Software Support**

Lenovo Enterprise Software Support is an additional support service that provides customers with software support on Microsoft, Red Hat, SUSE, and VMware applications and systems. Around the clock availability for critical problems plus unlimited calls and incidents helps customers address challenges fast, without incremental costs. Support staff can answer troubleshooting and diagnostic questions, address product compatibility and interoperability issues, isolate causes of problems, report defects to software vendors, and more.

- **YourDrive YourData**

Lenovo's YourDrive YourData service is a multi-drive retention offering that ensures that customer's data is always under their control, regardless of the number of drives that are installed in their Lenovo server. In the unlikely event of a drive failure, customers retain possession of their drive while Lenovo replaces the failed drive part. Customer's data stays safely on customer premises, in their hands. The YourDrive YourData service can be purchased in convenient bundles with Foundation, Essential, or Advanced services.

- **Health Check**

Having a trusted partner who can perform regular and detailed health checks is central to maintaining efficiency and ensuring that customer systems and business are always running at their best. Health Check supports Lenovo-branded server, storage, and networking devices, as well as select Lenovo-supported products from other vendors that are sold by Lenovo or a Lenovo-Authorized Reseller.

Some regions might have different warranty terms and conditions than the standard warranty. This is due to local business practices or laws in the specific region. Local service teams can assist in explaining region-specific terms when needed. Examples of region-specific warranty terms are second or longer business day parts delivery or parts-only base warranty.

If warranty terms and conditions include onsite labor for repair or replacement of parts, Lenovo will dispatch a service technician to the customer site to perform the replacement. Onsite labor under base warranty is limited to labor for replacement of parts that have been determined to be field-replaceable units (FRUs). Parts that are determined to be customer-replaceable units (CRUs) do not include onsite labor under base warranty.

If warranty terms include parts-only base warranty, Lenovo is responsible for delivering only replacement parts that are under base warranty (including FRUs) that will be sent to a requested location for self-service. Parts-only service does not include a service technician being dispatched onsite. Parts must be changed at customer's own cost and labor and defective parts must be returned following the instructions supplied with the spare parts.

Lenovo support services are region-specific. Not all support services are available in every region. For information about Lenovo support services that are available in a specific region, refer to the following resources:

- Service part numbers in Data Center Solution Configurator (DCSC):  
<http://dcsc.lenovo.com/#/services>
- Lenovo Services Availability Locator  
<https://lenovocator.com/>

For service definitions, region-specific details, and service limitations, refer to the following documents:

- Lenovo Statement of Limited Warranty for Data Center Group (DCG) Servers and System Storage  
<http://pcsupport.lenovo.com/us/en/solutions/ht503310>
- Lenovo Data Center Services Agreement  
<http://support.lenovo.com/us/en/solutions/ht116628>

## Deployment services

The MX systems include Lenovo deployment services to get customers up and running quickly.

The following optional Lenovo custom installation services are available for both the MX appliances and MX certified nodes:

- Unpacking and inspecting the systems
- Mounting the systems (rack cabinet, desktop, stack, bookshelf, wall or ceiling, or rack installation)
- Connecting the systems to electrical power and network
- Checking and updating firmware to the latest levels
- Verifying operations
- Disposal of the packaging materials (within the customer site)

The following Lenovo deployment services are available, mandatory for MX appliances and optional for the MX certified nodes:

- Conducting remote preparation and planning
- Verifying firmware versions and performing firmware updates, if needed
- Configuring XCC management settings
- Configuring Storage Spaces Direct
- Configuring Microsoft System Center and discovering hosts and storage (if System Center is used)
- Configuring Lenovo XClarity network settings and performing discovery and inventory (if XClarity is selected)
- Transferring knowledge
- Developing post-installation documentation

For more information, refer to the Data Center Deployment Services web page:

<https://www.lenovo.com/us/en/data-center/services/deployment>

## Rack cabinets

The following table lists the supported rack cabinets.

Table 24. Rack cabinets

Part number	Description
7D2B0001WW / 7D2N0001WW	12U 1200mm Deep Micro Datacenter Rack
7D2C0001WW / 7D2P0001WW	18U 1200mm Deep Micro Datacenter Rack
93072RX	25U Standard Rack
93072PX	25U Static S2 Standard Rack
93634PX	42U 1100mm Dynamic Rack
93634EX	42U 1100mm Dynamic Expansion Rack
93604PX	42U 1200mm Deep Dynamic Rack
93614PX	42U 1200mm Deep Static Rack
93084EX	42U Enterprise Expansion Rack
93084PX	42U Enterprise Rack
93074RX	42U Standard Rack

For specifications about these racks, see the Lenovo Rack Cabinet Reference, available from: <https://lenovopress.com/lp1287-lenovo-rack-cabinet-reference>

For more information, see the list of Product Guides in the Rack cabinets category: <https://lenovopress.com/servers/options/racks>

## Power distribution units

The following table lists the power distribution units (PDUs) that are offered by Lenovo.

Table 25. Power distribution units

Part number	Description
0U Basic PDUs	
00YJ776	0U 36 C13/6 C19 24A/200-240V 1 Phase PDU with NEMA L6-30P line cord
00YJ777	0U 36 C13/6 C19 32A/200-240V 1 Phase PDU with IEC60309 332P6 line cord
00YJ778	0U 21 C13/12 C19 32A/200-240V/346-415V 3 Phase PDU with IEC60309 532P6 line cord
00YJ779	0U 21 C13/12 C19 48A/200-240V 3 Phase PDU with IEC60309 460P9 line cord
Switched and Monitored PDUs	
00YJ780	0U 20 C13/4 C19 Switched and Monitored 32A/200-240V/1Ph PDU w/ IEC60309 332P6 line cord
00YJ781	0U 20 C13/4 C19 Switched and Monitored 24A/200-240V/1Ph PDU w/ NEMA L6-30P line cord
00YJ782	0U 18 C13/6 C19 Switched / Monitored 32A/200-240V/346-415V/3Ph PDU w/ IEC60309 532P6 cord
00YJ783	0U 12 C13/12 C19 Switched and Monitored 48A/200-240V/3Ph PDU w/ IEC60309 460P9 line cord
46M4003	1U 9 C19/3 C13 Switched and Monitored 60A 3 Phase PDU with IEC 309 3P+Gnd line cord
46M4004	1U 12 C13 Switched and Monitored DPI PDU (without line cord)
46M4005	1U 12 C13 Switched and Monitored 60A 3 Phase PDU with IEC 309 3P+Gnd line cord
Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets)	
71762NX	Ultra Density Enterprise C19/C13 PDU Module (without line cord)

Part number	Description
71763NU	Ultra Density Enterprise C19/C13 PDU 60A/208V/3ph with IEC 309 3P+Gnd line cord
C13 Enterprise PDUs (12x IEC 320 C13 outlets)	
39M2816	DPI C13 Enterprise PDU+ (without line cord)
39Y8941	DPI Single Phase C13 Enterprise PDU (without line cord)
C19 Enterprise PDUs (6x IEC 320 C19 outlets)	
39Y8948	DPI Single Phase C19 Enterprise PDU (without line cord)
39Y8923	DPI 60A 3 Phase C19 Enterprise PDU with IEC 309 3P+G (208 V) fixed line cord
Front-end PDUs (3x IEC 320 C19 outlets)	
39Y8938	DPI 30amp/125V Front-end PDU with NEMA L5-30P line cord
39Y8939	DPI 30amp/250V Front-end PDU with NEMA L6-30P line cord
39Y8934	DPI 32amp/250V Front-end PDU with IEC 309 2P+Gnd line cord
39Y8940	DPI 60amp/250V Front-end PDU with IEC 309 2P+Gnd line cord
39Y8935	DPI 63amp/250V Front-end PDU with IEC 309 2P+Gnd line cord
NEMA PDUs (6x NEMA 5-15R outlets)	
39Y8905	DPI 100-127V PDU with Fixed NEMA L5-15P line cord
Line cords for PDUs that ship without a line cord	
40K9611	DPI 32a Line Cord (IEC 309 3P+N+G)
40K9612	DPI 32a Line Cord (IEC 309 P+N+G)
40K9613	DPI 63a Cord (IEC 309 P+N+G)
40K9614	DPI 30a Line Cord (NEMA L6-30P)
40K9615	DPI 60a Cord (IEC 309 2P+G)
40K9617	DPI Australian/NZ 3112 Line Cord
40K9618	DPI Korean 8305 Line Cord

For more information, see the Lenovo Press documents in the PDU category:

<https://lenovopress.com/servers/options/pdu>

## Uninterruptible power supply units

The following table lists the uninterruptible power supply (UPS) units that are offered by Lenovo.

Table 26. Uninterruptible power supply units

Part number	Description
55941AX	RT1.5kVA 2U Rack or Tower UPS (100-125VAC)
55941KX	RT1.5kVA 2U Rack or Tower UPS (200-240VAC)
55942AX	RT2.2kVA 2U Rack or Tower UPS (100-125VAC)
55942KX	RT2.2kVA 2U Rack or Tower UPS (200-240VAC)
55943AX	RT3kVA 2U Rack or Tower UPS (100-125VAC)
55943KX	RT3kVA 2U Rack or Tower UPS (200-240VAC)
55945KX	RT5kVA 3U Rack or Tower UPS (200-240VAC)
55946KX	RT6kVA 3U Rack or Tower UPS (200-240VAC)
55948KX	RT8kVA 6U Rack or Tower UPS (200-240VAC)
55949KX	RT11kVA 6U Rack or Tower UPS (200-240VAC)
55948PX	RT8kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)
55949PX	RT11kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC)
55943KT†	ThinkSystem RT3kVA 2U Standard UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets)
55943LT†	ThinkSystem RT3kVA 2U Long Backup UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets)
55946KT†	ThinkSystem RT6kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output)
5594XKT†	ThinkSystem RT10kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output)

† Only available in China and countries in the Asia Pacific region.

For more information, see the list of Product Guides in the UPS category:

<https://lenovopress.com/servers/options/ups>

## Lenovo Financial Services

Lenovo Financial Services reinforces Lenovo's commitment to deliver pioneering products and services that are recognized for their quality, excellence, and trustworthiness. Lenovo Financial Services offers financing solutions and services that complement your technology solution anywhere in the world.

We are dedicated to delivering a positive finance experience for customers like you who want to maximize your purchase power by obtaining the technology you need today, protect against technology obsolescence, and preserve your capital for other uses.

We work with businesses, non-profit organizations, governments and educational institutions to finance their entire technology solution. We focus on making it easy to do business with us. Our highly experienced team of finance professionals operates in a work culture that emphasizes the importance of providing outstanding customer service. Our systems, processes and flexible policies support our goal of providing customers with a positive experience.

We finance your entire solution. Unlike others, we allow you to bundle everything you need from hardware and software to service contracts, installation costs, training fees, and sales tax. If you decide weeks or months later to add to your solution, we can consolidate everything into a single invoice.

Our Premier Client services provide large accounts with special handling services to ensure these complex transactions are serviced properly. As a premier client, you have a dedicated finance specialist who manages your account through its life, from first invoice through asset return or purchase. This specialist develops an in-depth understanding of your invoice and payment requirements. For you, this dedication provides a high-quality, easy, and positive financing experience.

For your region-specific offers, please ask your Lenovo sales representative or your technology provider about the use of Lenovo Financial Services. For more information, see the following Lenovo website:

<https://www.lenovo.com/us/en/landingpage/lenovo-financial-services/>

## Related publications and links

For more information, see these resources:

- Lenovo ThinkAgile MX Series product page  
<https://www.lenovo.com/us/en/data-center/software-defined-infrastructure/ThinkAgile-MX-Certified-Node/p/WMD00000377>
- Microsoft Azure Stack HCI documentation  
<https://docs.microsoft.com/en-us/azure-stack/hci/overview>
- Lenovo Data Center Solution Configurator (DCSC):  
<https://dcsc.lenovo.com>
- Lenovo ThinkAgile MX for Microsoft Azure Stack HCI Best Recipes  
<https://datacentersupport.lenovo.com/us/en/solutions/ht507406>

## Related product families

Product families related to this document are the following:

- [Microsoft Alliance](#)
- [ThinkAgile MX Series](#)
- [Hyperconverged Infrastructure](#)
- [Hyperconverged Infrastructure](#)

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This document, LP1175, was created or updated on June 14, 2021.

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