Lenovo ThinkAgile HX1021 Certified Node
Product Guide

The ThinkAgile HX1021 Certified Node is a purpose-built Nutanix certified node that is half the width and significantly shorter than a traditional server, making it ideal for deployment in tight spaces. It can be mounted on a wall, stacked on a shelf or mounted in a rack. The ThinkAgile HX1021 puts increased processing power, storage and network closer to where data is generated, allowing actions resulting from the analysis of that data to take place more quickly.

The ThinkAgile HX Certified Nodes deliver fully validated and integrated Lenovo hardware and firmware, certified and preloaded with Nutanix software. This does not include license to Nutanix software and enhanced software support. Nutanix brings the benefits of web-scale technologies to enterprise applications through enterprise storage, data protection, infrastructure resilience, management and analytics, and security.

Suggested uses: edge computing (IoT, AI, machine learning), retail, video security, inventory management, building control, telecommunications, manufacturing, distribution

Figure 1. ThinkAgile HX1021 Certified Node

Did you know?

Customers looking for computing solutions at the edge of their networks often have to compromise -- to use either datacenter-class equipment which is too large and power hungry, or PC based equipment which can't run their enterprise level applications. The ThinkAgile HX1021 fits the space between those two extremes. Its compact design, low power usage, and high performance are just the right combination for edge locations. The HX1021 can be wall mounted, stacked on a shelf or installed in a rack. It is also designed to operate in rugged environments, up to 55°C.

Key features

The ThinkAgile HX1021 Certified Nodes offer the following key features

- Built on a proven and reliable Lenovo ThinkSystem server purpose-built server that is half the width and significantly shorter than a traditional server, making it ideal for deployment in tight spaces. It can be mounted on a wall, stacked on a shelf or mounted in a rack.
- Deliver fully validated and integrated hardware and firmware that is certified with Nutanix software.
- Preloaded with Nutanix software and ready for out-of-box deployment (software licenses are not included).
- Provide flexibility in using the existing Nutanix term-based software licenses and active support contracts or purchasing new software licenses and support contracts from Nutanix.
- Offer optional Lenovo Professional Services to get customers up and running quickly

The Nutanix software running on the HX1021 delivers the following key features:

- A natively integrated solution for data protection and continuous availability at VM granularity that gives administrators an affordable range of options to meet the recovery point objectives (RPO) and recovery time objectives (RTO) for different applications.
- A fault resistant platform, with no single point of failure and no bottlenecks with shared-nothing architecture, where all data, metadata and services are distributed to all nodes within the cluster, that is built to detect, isolate and recover from failures anywhere in the system.
- An intuitive user-centric management experience to simplify every aspect of the IT infrastructure lifecycle and provide a single pane of glass to monitor and control Nutanix clusters, with simplified workflows and rich automation for common administrative tasks.
- Powerful security features, such as two-factor authentication and data-at-rest encryption, with a security development lifecycle that is integrated into product development to help customers meet the most stringent security requirements.

The ThinkAgile HX1021 puts increased processing power, storage and network closer to where data is generated, allowing actions resulting from the analysis of that data to take place more quickly. The server has wired connections up to 10GbE.

Scalability and performance

The HX1021 offers numerous features to boost performance, improve scalability and reduce costs:

- Support a single processor from the Intel Xeon D Processor family. Supports processors up to 16 cores, core speeds of up to 2.2 GHz, and TDP ratings of up to 100W.
- Intelligent and adaptive system performance with Intel Turbo Boost Technology 2.0 allows processor cores to run at maximum speeds during peak workloads by temporarily going beyond processor TDP.
- Intel Hyper-Threading Technology boosts performance for multithreaded applications by enabling simultaneous multithreading within each processor core, up to two threads per core.
- Intel Virtualization Technology integrates hardware-level virtualization hooks that allow operating system vendors to better use the hardware for virtualization workloads.
- Support for up to 4 TruDDR4 memory DIMMs an up to 256 GB of memory using 64 GB DIMMs.
- Up to 8 M.2 data drives -- NVMe -- provide efficient and rugged storage for edge workloads.
- 2 M.2 SATA drives are used for OS boot.
- The use of NVMe drives increased performance over SATA drives, in terms of throughput, bandwidth, and latency.
- Two 10 GbE SFP+ or 10GBASE-T ports standard for high-speed networking to back-end servers.
- Support for the NVIDIA T4 GPU for enhanced workloads at the edge of your network.

Availability and serviceability

The HX1021 provides many features to simplify serviceability and increase system uptime:

- Supports remote management, including remote control functions down to the UEFI level (most models) makes managing the edge servers easy even without onsite IT personnel.
- ECC memory and memory RAS features including Single Device Data Correction (SDDC, also known as Chipkill)
- RAID redundancy on SATA drives for greater system uptime.
- Two redundant AC Adapter power supplies and three N+1 redundant fans to provide improved availability.
- Redundant management ports (using a Wired Network Module) allow you to have redundant wired connections to the server.
- Built-in XClarity Controller continuously monitors system parameters, triggers alerts, and performs recovery actions in case of failures to minimize downtime.
- Auto restart in the event of a loss of AC power
- Support for the XClarity Administrator Mobile app running on a supported smartphone and connected to the server through the service-enabled USB port, enables additional local systems management functions.
- Three-year customer-replaceable unit and onsite limited warranty, 9 x 5 next business day. Optional service upgrades are available.

Manageability and security

Systems management features simplify local and remote management of the HX1021:

- Lenovo XClarity Controller (XCC) monitors server availability and performs remote management. XCC Advanced (Included), which enables remote KVM. Included XCC Enterprise enables the mounting of remote media files (ISO and IMG image files), boot capture, and power capping.
- Lenovo XClarity Administrator offers comprehensive hardware management tools that help to increase uptime, reduce costs and improve productivity through advanced server management capabilities.
- IT Administrators can securely claim and activate the HX1021 remotely through the ThinkShield Key Vault Portal, available on the web. They can also manage and unlock their global IoT edge fleet for initial operation and in case of tamper. The ThinkShield Edge Mobile Management app enables Edge Users to securely claim and activate the ThinkAgile HX1021 in an easy to use Web UI.
- Integrated Trusted Platform Module (TPM) support enables advanced cryptographic methods, such as digital signatures and remote attestation.
- Industry-standard Advanced Encryption Standard (AES) NI support for faster, stronger encryption.
- Intel Trusted Execution Technology provides enhanced security through hardware-based resistance to malicious software attacks, allowing an application to run in its own isolated space, protected from all other software running on a system.

Components and connectors

The ports on the front of the HX1021 system depend on which network module is installed.

The following figure shows server with the 10Gb SFP+ network module installed. With this network module, the server has a variety of wired connectivity capabilities has two 10Gb SFP+ Ethernet ports, 2 Gigabit Ethernet ports, and 2 ports for management that support either redundancy or daisy-chaining multiple HX1021 servers together to reduce cabling requirements on the management LAN.
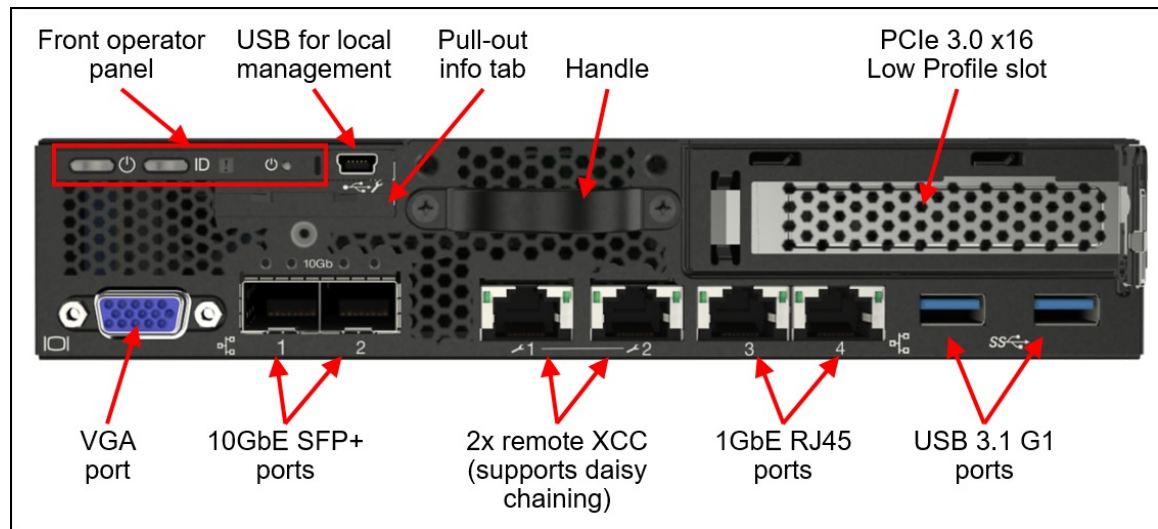

Figure 2. Front view of the ThinkAgile HX1021 with 10G SFP+ network module

The following figure shows server with the 10GBASE-T network module installed. The connectors are the same as with the 10G SFP+ network module except the two 10G SFP+ ports are replaced with 10GBASE-T ports.
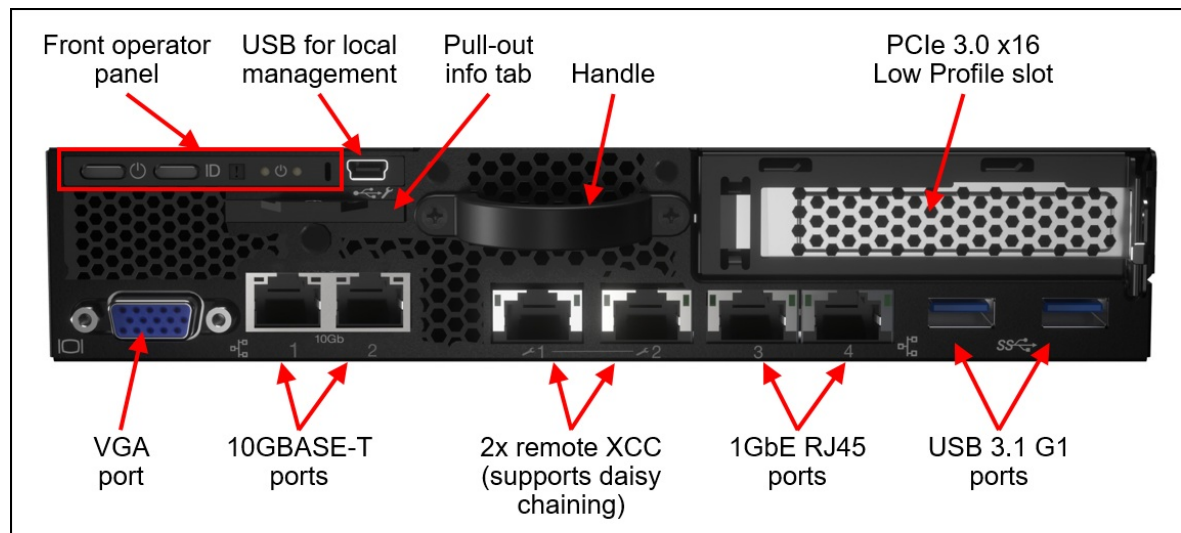

Figure 3. Front view of the ThinkAgile HX1021 with 10GBASE-T network module

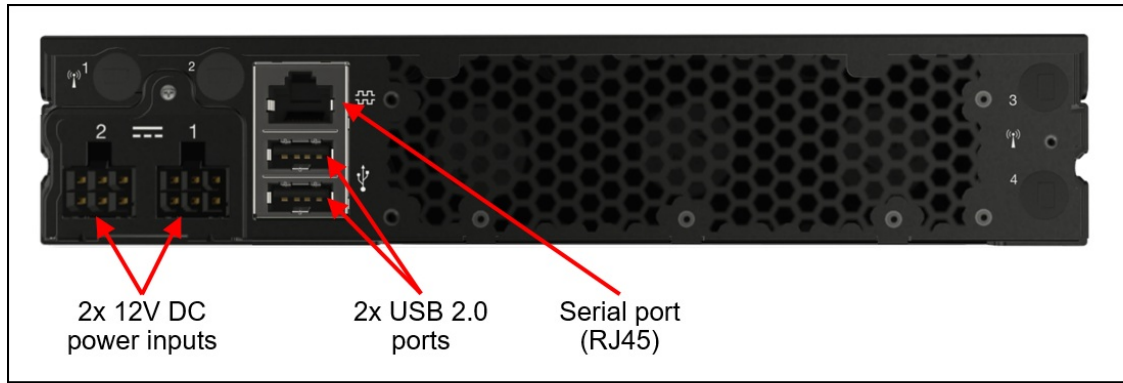The following figure shows the rear of the HX1021 system.

Figure 4. Rear view of the ThinkAgile HX1021

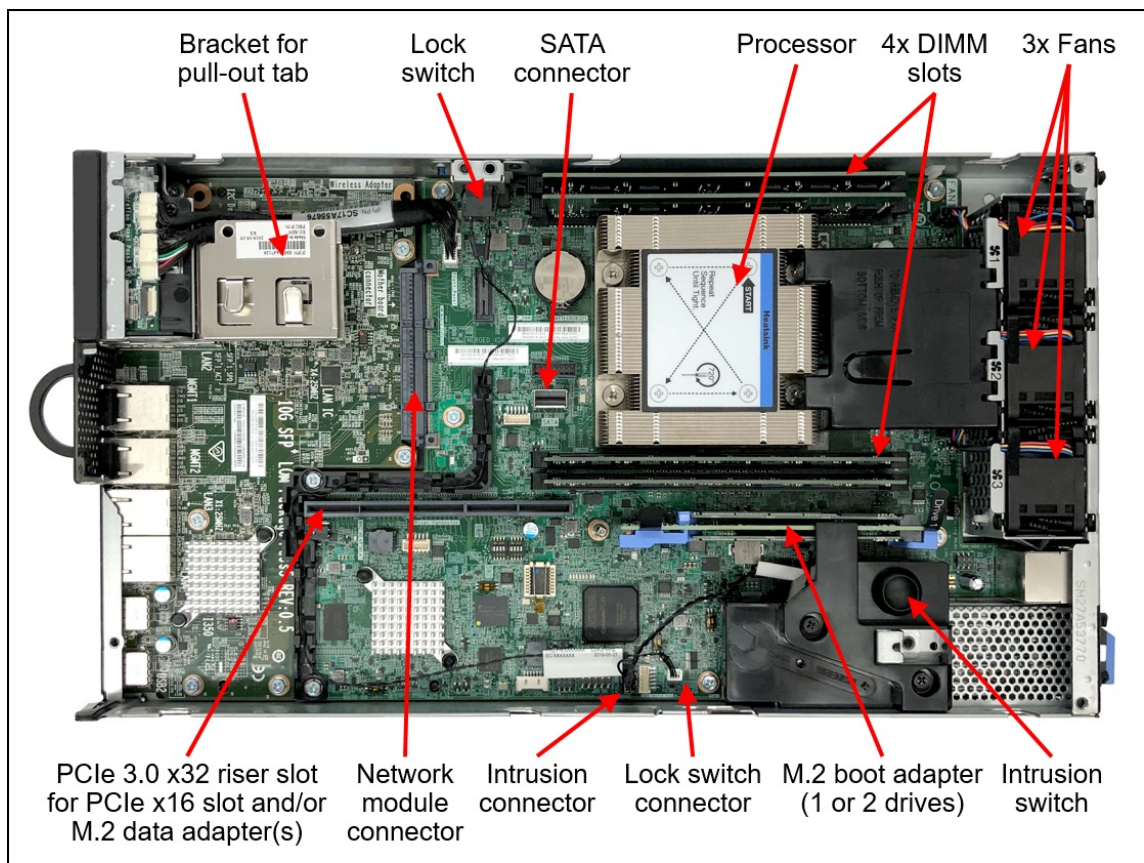The following figure shows the locations of key components inside the server.

Figure 5. Internal view of the ThinkAgile HX1021

System architecture

The following figure shows the architectural block diagram of the HX1021 system, showing the major components and connections.

Tip: The wrench icons show where the local and remote management functions are enabled
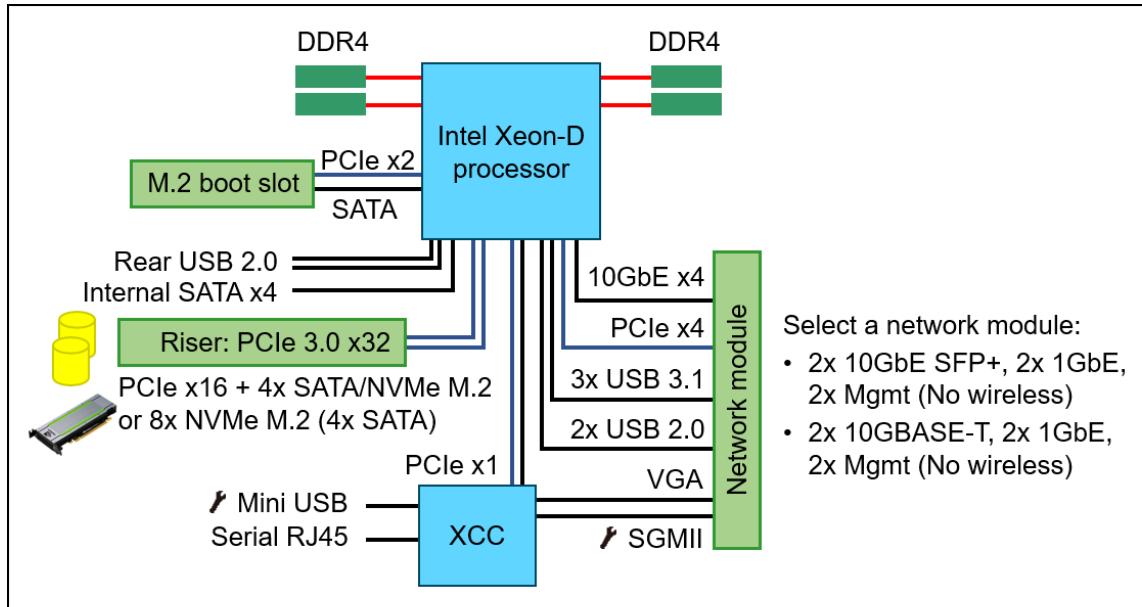

Figure 6. HX1021 system board - architectural block diagram

The system board connects to a network module which provides all network connections. Two wired network modules are offered. The block diagrams are shown in the following figure. All wired connections are at the front of the server.
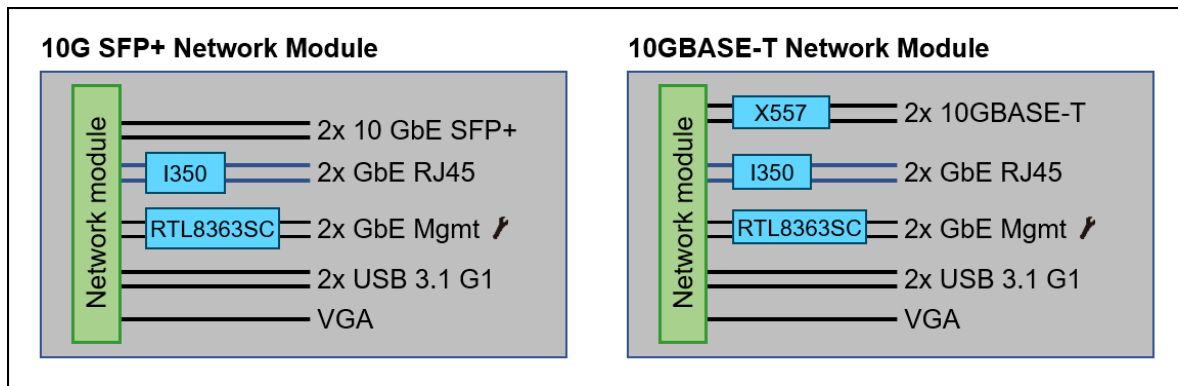

Figure 7. HX1021 network modules - architectural block diagrams

Standard specifications

The following table lists the standard specifications.

Table 1. Standard specifications

Components	Specification
Machine types	7D20 - HX1021 - 3 year warranty 7D22 - ThinkAgile E1 and E2 Enclosures - 3 year warranty
Form factor	Edge system, 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. The processor has 4 memory channels, with 1 DIMM per channel. Lenovo TruDDR4 DIMMs operating at 2666 MHz. RDIMMs and LRDIMMs are supported
Memory maximum	Up to 256GB with 4x 64GB LRDIMMs
Memory protection	ECC, SDDC (for x4-based memory DIMMs)
Drive bays	Internal storage is implemented using M.2 drives (no 2.5-inch 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. ● 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 only, 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: 5.2 TB using 8x 650GB NVMe drives

Storage controller	● Boot drives:
	  ○ Dual-drive adapter: Marvell 88SE9230 6 Gbps SATA controller - RAID-1 (UEFI Boot mode only)
	● Data drives:
	  ○ NVMe Adapter: Onboard SATA controller supporting RAID 0, 1, 5, 10 (Intel RSTe)

Network interfaces	Networking depends the network module selected: ● Wired SFP+ 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. ● Wired BASE-T network module (10GBASE-T LOM package): 2x 10GBASE-T RJ45, 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. The PCIe 3.0 x16 slot can also be used for an additional network card once supported. **Note**: The Wireless network module is not supported.
PCI Expansion slots	One PCIe 3.0 x16 slot

Components	Specification
GPU adapters	One NVIDIA T4 GPU
Ports	Front: Two USB 3.1 G1 (5 Gb/s) ports, VGA port, One or two dedicated RJ-45 1GbE systems management port (depends on network module selected), dedicated mini-USB port for local systems management including initial activation. 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	12V DC using one or two external AC power adapters with plugged inputs. Two adapters form a redundant pair in most configurations. Power source is 100-127 V AC (3.2A) or 200-240V AC (1.6A) for each adapter.
Video	G200 graphics with 16 MB memory with 2D hardware accelerator, integrated into XClarity Controller. Maximum resolution is 1920x1200 32bpp at 60Hz.
Systems management	Operator panel with status LEDs. Dedicated ports for local management (mini USB for use with mobile app) and remote management (RJ45 Ethernet ports). XClarity Controller Enterprise embedded management with remote control functions enabled, XClarity Administrator centralized infrastructure delivery, XClarity Integrator plugins, and XClarity Energy Manager centralized server power management. ThinkShield Edge Mobile Management mobile app and XClarity Mobile app for local onsite HX1021 server management.
Security features	ThinkShield Key Vault Portal web site for security management. Front locking bezel (optional), Kensington cable slot with intelligent lock position switch, motion detection, intrusion detection (optional), self-encrypting drive (SED) support, power-on password, administrator's password.
Software	Nutanix Acropolis Pro and Ultimate editions (licenses purchased separately from Nutanix).
Hypervisors	Nutanix AHV, VMware ESXi. See the Operating system support section for specifics.
Mounting options	Horizontal or vertical orientation. DIN rail wall mount, ceiling mount, 1U rack mount (2 servers), 2U short-depth rack mount (2 servers). Available locking bezel with dust filter.
Limited warranty	Three-year customer-replaceable unit and onsite limited warranty with 9x5 next business day (NBD).
Service and support	Optional service upgrades are available through Lenovo Services: 4-hour or 2-hour response time, 6-hour fix time, 1-year or 2-year warranty extension, software support for Lenovo hardware and some third-party applications.
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)

Models

Factory-integrated models of the ThinkAgile HX1021 nodes are configured by using the Lenovo Data Center Solution Configurator (DCSC), https://dcsc.lenovo.com. The following table lists the base CTO models.

During the configuration process, you are selecting one of the base Configure-to-Order (CTO) models first, and then you are adding system components (processors, memory, drives, and network adapters) to the selected model according to the output from the Nutanix Sizer tool: http://services.nutanix.com/

The following table lists the CTO base models of the ThinkAgile HX1021 Certified Nodes and Enclosures.

Table 2. Base CTO models

Machine Type/Model	Description
Systems	
7D20CTO1WW	HX1021 Certified Node
Rack Enclosures	
7D22CTO5WW	1U ThinkAgile E1 Enclosure for Certified Node
7D22CTO6WW	2U ThinkAgile E2 Enclosure for Certified Node

Configuration note: The ThinkAgile Enclosure is required for selection for mounting two ThinkAgile HX1021 Certified Nodes in a rack cabinet.

The ThinkAgile HX1021 Certified Nodes ship with the following items:

- Activation Flyer
- ISG IoT Compliance Booklet
- One or two AC power adapters
- One or two AC customer-selected power cables (per node)
- Slide Rail (if configured with the enclosure)
- Cable Management Arm (if configured with the enclosure

Processors

The HX1021 supports processors in the Intel Xeon D-2100 family of processors (formerly codenamed "Skylake D"). The server supports one processor and the processor is soldered on the system board.

The table below lists the supported processors.

All supported processors have the following characteristics:

- Intel Turbo Boost 2.0
- Intel Hyper-Threading Technology
- Intel Virtualization Techology (VT-x, VT-d)
- Intel TSX-NI
- Intel AES New Instructions
- Secure Key
- Intel Memory Protection Extensions (Intel MPX)
- Intel Trusted Execution Technology
- Execute Disable Bit
- Intel OS Guard
- Intel Boot Guard

Part numbers: There are no part numbers for processors because there are no field upgrades supported.

Support for additional processors: The table below lists the processors supported across all configurations. Additional processors may also be supported. Please contact your Lenovo representative regarding the support of additional options through our Special Bid ordering process.

Table 3. Processor options for the HX1021

Feature code* Description B6ES / B93A ThinkSystem SE350 Edge Server Intel Xeon D-2143IT 8C 65W 2.20 GHz B6EU / B93C ThinkSystem SE350 Edge Server Intel Xeon D-2163IT 12C 75W 2.10 GHz B6EV / B93D ThinkSystem SE350 Edge Server Intel Xeon D-2166NT 12C 85W 2.00 GHz B6ET / B93B ThinkSystem SE350 Edge Server Intel Xeon D-2183IT 16C 100W 2.20 GHz
* The second feature code is for CTO orders from NA and LA geographies, and for Brazil

The following table lists the features of the supported processors.

Table 4. Processor specifications

Intel model	Cores / Threads	HT	TB	Base Frequency	Max Boost Frequency	L3 Cache	Memory channels	Memory bus	TDP
D-2143IT	8 / 16	Y	Y	2.20 GHz	3.00 GHz	11 MB	4	2133 MHz	65 W
D-2163IT	12 / 24	Y	Y	2.10 GHz	3.00 GHz	17 MB	4	2133 MHz	75 W
D-2166NT	12 / 24	Y	Y	2.00 GHz	3.00 GHz	17 MB	4	2133 MHz	85 W
D-2183IT	16 / 32	Y	Y	2.20 GHz	3.00 GHz	22 MB	4	2400 MHz	100 W

Memory options

The server uses processors with 4 memory channels and supports 1 DIMM per channel, for a total of 4 DIMMs. The server supports up to 256GB of memory using 4x 64 GB LRDIMMs.

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

Lenovo TruDDR4 memory uses the highest quality components that are sourced from Tier 1 DRAM suppliers and only memory that meets the strict requirements of Lenovo is selected. It is compatibility tested and tuned to maximize performance and reliability. From a service and support standpoint, Lenovo TruDDR4 memory automatically assumes the system warranty, and Lenovo provides service and support worldwide.

Table 5. Supported memory options

Part number	Feature code	Description	Minimum supported	Maximum supported
RDIMMs				
7X77A01303	AUNC	ThinkSystem 16GB TruDDR4 2666 MHz (2Rx8 1.2V) RDIMM	4	4
7X77A01304	AUND	ThinkSystem 32GB TruDDR4 2666 MHz (2Rx4 1.2V) RDIMM	2	4
4X77A85855	BUG8	ThinkSystem SE350 16GB TruDDR4 3200 MHz (2Rx8 1.2V) RDIMM	1	4
4X77A85861	BUG9	ThinkSystem SE350 32 GB TruDDR4 3200 MHz (2Rx8 1.2V) RDIMM	1	4

The following rules apply when selecting the memory configuration:

- The server supports RDIMMs and LRDIMMs.
- All DIMMs must be identical.
- Supported DIMMs are rated up to 2666 MHz, however the processors used by the server run at a lower speed (2133 MHz or 2400 MHz). As a result, the memory bus operates at the lower speed set by the processor.
- Memory mirroring and memory rank sparing are not supported.
- Recommended installation sequence: 1, 4, 2, 3

The following memory protection technologies are supported:

- ECC detection/correction
- SDDC (for x4-based memory DIMMs; look for "x4" in the DIMM description)

I/O expansion

The HX1021 has one PCIe x32 riser slot that accepts a riser that supplies both M.2 data drive adapter and a PCIe slot, depending on the riser selected. The following figure shows the location of the riser cage.
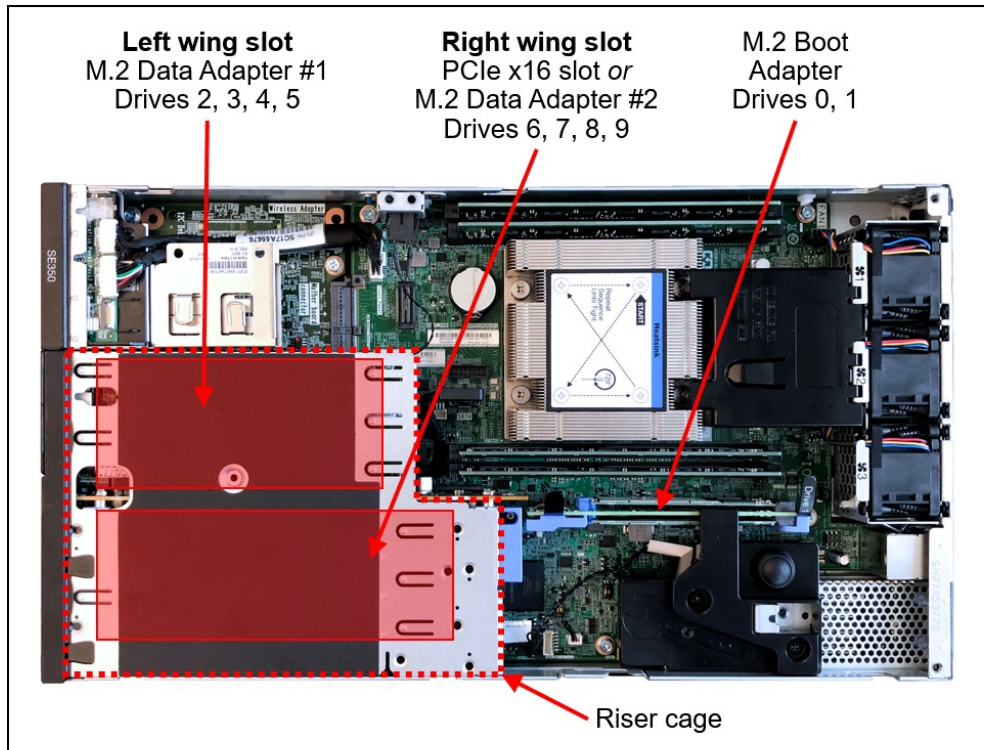
Figure 8. Location of riser cage

The two halves of the riser, referred to as "wings", support an M.2 or PCIe adapter depending on the riser. The left wing is on the left side as viewed from the front of the server. The following table lists the available riser cards.

Table 6. HX1021 riser card selections

Part number	Feature code	Description
4M17A60521	B6FD	ThinkSystem SE350 PCIe Riser Cage ● Left wing: M.2 4-bay adapter ● Right wing: PCIe 3.0 x16 LP slot
4M17A60522	B6FE	ThinkSystem SE350 M.2 Riser Cage ASM ● Left wing: M.2 4-bay adapter ● Right wing: M.2 4-bay adapter

The PCIe Riser Cage, when viewed from the underside, is shown in the following figure. The figure shows an M.2 SATA/NVMe adapter installed in the left wing and an NVIDIA T4 GPU installed in the right wing. The left wing supports NVMe M.2 drives and the right wing offers a PCIe 3.0 x16 Low Profile slot for supported adapters.
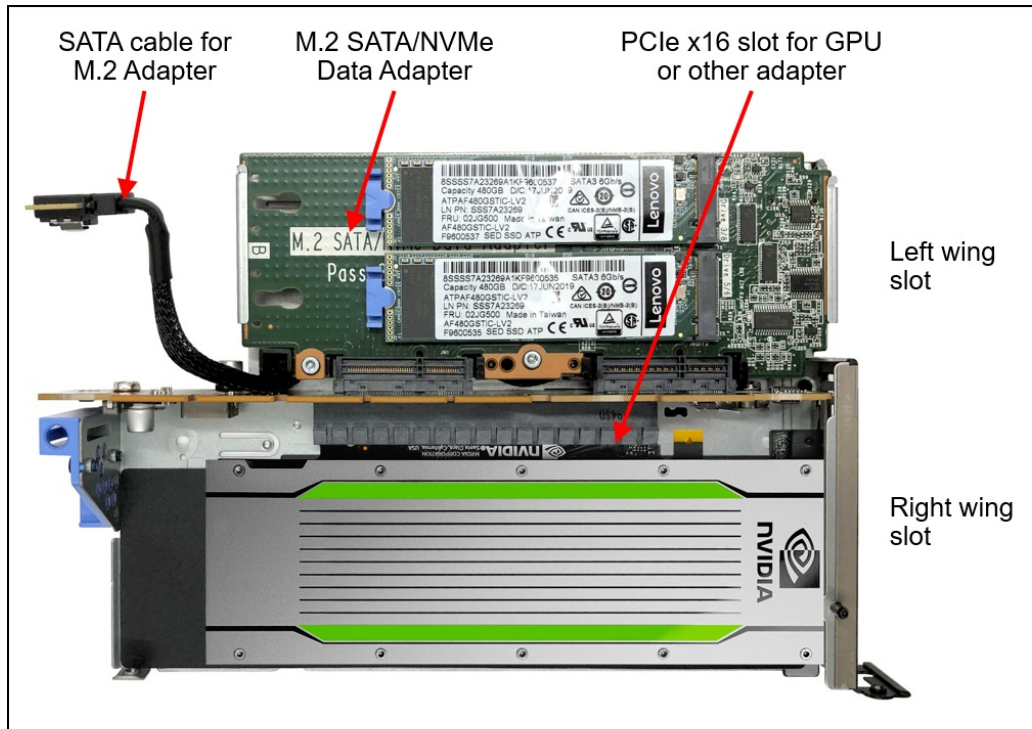
Figure 9. HX1021 PCIe Riser Cage (feature B6FD)

The M.2 Riser Cage, when viewed from the underside, is shown in the following figure. The figure shows an M.2 SATA/NVMe adapter installed in both the left wing (top) and right wing (bottom).
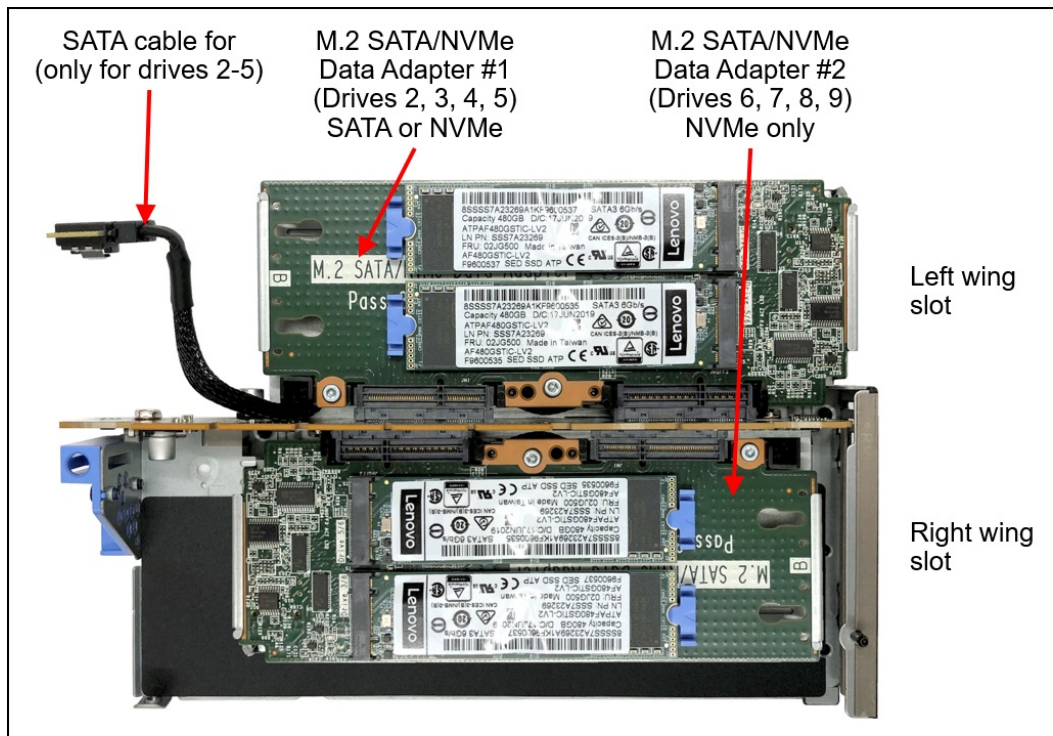

Figure 10. HX1021 M.2 Riser Cage (feature B6FE)

Internal storage

The internal storage of the HX1021 system is implemented as M.2 drives. The drives are defined as either boot drives or data drives, based on their intended use in the server.

Internal drives are as follows:

- Data drives are installed in a four-port data drive adapter mounted in the riser card that is installed in a riser slot, as described in the I/O expansion section. One or two four-drive adapters are supported in the HX1021 for a total of up to eight data drives.

- Boot drives are installed on an M.2 boot adapter, which in turn is installed in a dedicated slot on the system board (see the figure in the I/O expansion section). Two SATA M.2 drives are supported.

Controllers for internal storage

The HX1021 has the following storage controllers:

- ThinkSystem M.2 Enablement Kit, 7Y37A01092, for boot drives
    - SATA drive: SATA controller of the processor (single drive, no RAID)
    - NVMe drives: No support
- ThinkSystem SE350 M.2 Mirroring Enablement Kit, 4M17A60519, for boot drives
    - SATA drives: Marvell 88SE9230 6 Gbps SATA controller on the M.2 adapter (RAID-0, 1; Hardware RAID)
    - NVMe drives: No support

    Note: The M.2 Mirroring Enablement Kit supports UEFI Boot mode only; no Legacy BIOS support

- ThinkSystem SE350 M.2 SATA/NVMe 4-bay Data Drive Enablement Kit, 4M17A37281, for data drives
    - NVMe drives: Direct connection to the processor (no RAID)

    Note: SATA drives are not supported for use as data drives.

Table 7. M.2 adapters

Part number	Feature code	Description	Maximum supported
Data drive adapters			
4M17A37281	B6FF	ThinkSystem SE350 M.2 SATA/NVMe 4-bay Data Drive Enablement Kit	2
Boot drive adapters			
4M17A60519	B88P	ThinkSystem SE350 M.2 Mirroring Enablement Kit	1

Both left and right wings support NVMe drives when using the SATA/NVMe 4-bay Data Drive Adapter.

The following table lists the supported combinations of drive adapters.

Table 8. Supported combinations of riser card adapters

Config	Riser selection	Left wing (from front)	Drives	Right wing (from front)	Drives
1	PCIe Riser	M.2 SATA/NVMe Adapter	NVMe	PCIe Adapter	None
4	M.2 Riser	M.2 SATA/NVMe Adapter	NVMe	M.2 SATA/NVMe Adapter	NVMe

The ThinkSystem SE350 M.2 Mirroring Enablement Kit (dual M.2 boot adapter) is shown in the following figure, with one 128GB M.2 drive partially inserted. The second M.2 drive is installed on the other side of the adapter.

Figure 11. ThinkSystem SE350 M.2 Mirroring Enablement Kit

Note: The ThinkSystem SE350 M.2 Mirroring Enablement Kit is the same hardware as the ThinkSystem M.2 with Mirroring Enablement Kit that is supported in ThinkSystem rack servers (7Y37A01093), however the firmware is different. They are not interchangeable and 7Y37A01093 is not supported on the HX1021.

Internal drive options

The following table lists the supported drive options. The table also indicates which drives are supported in a data drive adapter and which drives are supported in a boot drive adapter.

Note: SED drives are not available in all markets:

- All SED drives are not available in China
- ATP SED drives are not available in Russia/CIS

SATA drives: As described in the I/O expansion section, SATA drives are not supported as data drives.

Drive encryption: SATA and NVMe drives with SED encryption are only supported in UEFI Boot mode. Legacy BIOS mode is not supported.

Table 9. Supported M.2 drives

Part number	Feature code	Description	Adapter support	
			Data Drive (SATA-NVMe)	Boot Drive (Dual Adpter)
SATA drives without encryption				
4XB7A39423	B91K	ThinkSystem M.2 480GB Industrial A600i SATA SSD	No	Yes
NVMe drives with encryption (drive options include a heatsink) (UEFI Boot mode only)				
4XB7A39428	B75E	ThinkSystem M.2 2TB P4511 NVMe SED SSD	Yes	No
4XB7A82675	BQUK	ThinkSystem M.2 7450 PRO 1.92TB Read Intensive NVMe PCIe 4.0 x4 NHS SSD (with Heatsink)	Yes	No

The use of M.2 drives in high temperature and high shock & vibration conditions is described in the Operating Environment section.

The following table compares the performance specifications of the M.2 drives.

Table 10. M.2 performance specifications

Part number	Description	Endurance DWPD	Endurance TBW	IOPS reads	IOPS writes	Sequential read rate	Sequential write rate	Read latency	Write latency
ATP A600i									
4XB7A39423	M.2 480GB Industrial A600i SATA	0.4 DWPD	384 TB	100,200 IOPS	82,800 IOPS	560 MB/s	390 MB/s	N/A	N/A
Intel P4511 SED (Opal Encryption)									
4XB7A39426	M.2 650GB P4511 NVMe SED HE	3.0 DWPD	3900 TB	295,000 IOPS	31,000 IOPS	2000 MB/s	1050 MB/s	85 µs	40 µs

Network Modules

The network ports on the front of the HX1021 are provided by a Network Module, a board that plugs into the system board by a dedicated connector. See the Internal view for the location of the connector. The Network Modules are listed in the following table.

Table 11. Network Modules

Part number	Feature code	Description
CTO only	B6F4	ThinkSystem SE350 10GbE SFP+ 2-Port, 10/100/1GbE RJ45 2-Port Intel i350 SFP+ Wired Network Module
CTO only	B7Z7	ThinkSystem SE350 4xRJ45 10GBASE-T LOM Package 10GBASE-T Wired Network Module

The Network Modules have the following characteristics:

- SFP+ Wired Network Module (also known as the 10G SFP+ LOM package), offering these network connections:
    - 2x 10GbE SFP+
    - 2x 1GbE RJ45 (support 10/100 Mbps)
    - 2x dedicated ports for remote management (can be used as redundant connections or daisy-chain capable)
    - VGA port
    - 2x USB 3.1 G1 ports

- 10GBASE-T Wired Network Module (also known as the 10GBASE-T LOM Package), offering these network connections:
    - 2x 10GBASE-T RJ45
    - 2x 1GbE RJ45 (support 10/100 Mbps)
    - 2x dedicated ports for remote management (can be used as redundant connections or daisy-chain capable)
    - VGA port
    - 2x USB 3.1 G1 ports

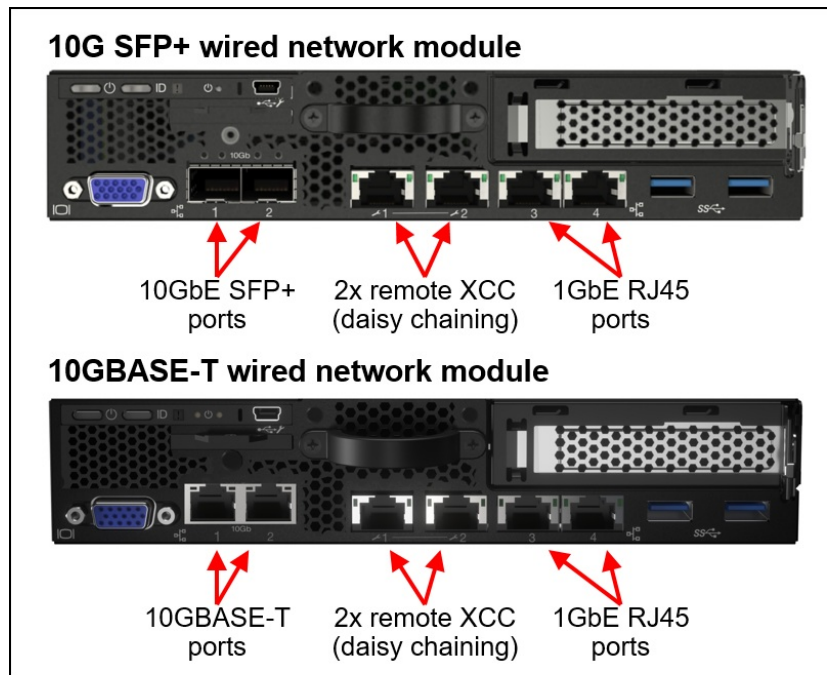The network modules are shown in the following figure.

Figure 12. Ports of the available Network Modules

The block diagrams of the Network Modules are shown in the System architecture section.

The specifications of the connections in the two Wired Network Modules are as follows:

- 10 GbE connections:
    - RJ45 ports or SFP+ cages, depending on the Network Module
    - Routed from the networking functions integrated in the Xeon-D processor
    - Based on the Intel X722 controller
    - Supports iWARP
    - Port 1 of the 10GbE ports can be shared with the XCC management processor for Wake-on-LAN and NC-SI support

- 1GbE RJ45 ports
    - Based on Intel I350 controller

- 1GbE XCC management ports:
    - Direct connections to the XClarity Controller (XCC) management processor
    - Based on Realtek RTL8363SC controller
    - Two ports, either as a redundant pair of ports or can be used as a daisy chain with multiple nearby HX1021 servers

Both Wired Network Modules provide the ability to daisy-chain the XCC management connections thereby reducing the number of ports you need in your management switches and reducing the number of switch ports needed for systems management. With this feature you can connect the first HX1021 to your management network and the adjacent HX1021 connects to the first HX1021. The third HX1021 can then connect to the second HX1021. Up to 7 servers can be connected in a daisy-chain configuration.

The two management ports of the Wired Network Modules can also be used to form a redundant pair. In such a configuration, they share the same IP address; redundancy is at the Layer 2 level.

The SFP+ ports in the SFP+ Wired Network Module support the transceivers listed in the following table.

Table 12. Transceivers for Network Modules

Part number	Feature code	Description
10Gb transceivers		
46C3447	5053	SFP+ SR Transceiver

The SFP+ ports of the Network Modules support the following fiber optic cables and direct-attach copper (DAC) cables.

Table 13. 10GbE Optical cables and DAC cables

Part number	Feature code	Description
LC-LC OM3 Fiber Optic Cables (these cables require a 10 GbE SFP+ SR transceiver)		
00MN499	ASR5	Lenovo 0.5m LC-LC OM3 MMF Cable
00MN502	ASR6	Lenovo 1m LC-LC OM3 MMF Cable
00MN505	ASR7	Lenovo 3m LC-LC OM3 MMF Cable
00MN508	ASR8	Lenovo 5m LC-LC OM3 MMF Cable
00MN511	ASR9	Lenovo 10m LC-LC OM3 MMF Cable
00MN514	ASRA	Lenovo 15m LC-LC OM3 MMF Cable
00MN517	ASRB	Lenovo 25m LC-LC OM3 MMF Cable
00MN520	ASRC	Lenovo 30m LC-LC OM3 MMF Cable
SFP+ 10Gb Passive DAC Cables		
00AY764	A51N	1.5m Passive DAC SFP+ Cable
00AY765	A51P	2m Passive DAC SFP+ Cable
90Y9430	A1PJ	3m Passive DAC SFP+ Cable

The RJ45 ports of the Network Modules support the following Category 6 (CAT 6) cables.

Table 14. CAT6 cables

Part number	Feature code	Description
CAT6 Green Cables		
00WE123	AVFW	0.75m CAT6 Green Cable
00WE127	AVFX	1.0m CAT6 Green Cable
00WE131	AVFY	1.25m CAT6 Green Cable
00WE135	AVFZ	1.5m CAT6 Green Cable
00WE139	AVG0	3m CAT6 Green Cable

Network adapters

Currently, no additional networking adapters are supported installed in the PCIe slot.

GPU adapters

The following table lists additional supported GPUs that can be installed in the PCIe slot when the PCIe Riser (feature B6FD) is selected.

Table 15. Supported GPUs

Part number	Feature code	Description	Maximum supported
GPUs			
4X67A14926	B4YB	ThinkSystem NVIDIA Tesla T4 16GB PCIe Passive GPU	1
GPU holder for A2 and T4			
4M17A60523	BAGM	ThinkSystem SE350 NVIDIA A2/T4 GPU Holder (Extreme Shock & Vibe)	1

The use of a GPU in high temperature and high shock & vibration conditions is described in the Operating Environment section.

For information about the GPU, see the ThinkSystem GPU Summary, available at:
https://lenovopress.com/lp0768-thinksystem-thinkagile-gpu-summary

Cooling

The system has three 40 mm non-hot-swap fans. All three are standard and support N+1 redundancy.

Power supplies

The HX1021 is powerd by a 12V Power Distribution Module (PDM) connected to one or two plug-in external AC adapters. One or two AC adapters are used to provide power. Ordering information is listed in the following table.

Table 16. Power options

Part number	Feature code	Description	Maximum supported
Power distribution modules (PDMs)			
CTO only	B6FU	ThinkSystem SE350 12V PDM	1
AC adapter for 12V PDM			
4X27A37265	B6FW	ThinkSystem SE350 240W AC Adapter ● 100-240V, 3.1A ● Maximum output: 20A, 240W	2

Details regarding the use of AC adapters:

- One or two AC adapters are supported.

- When two AC adapters are connected, the second AC adapter is redundant.

- Most configurations have a power budget of less than one AC adapter, however any of the following configurations are likely to exceed the power budget of a single AC adapter and will require the second AC adapter be connected:
  - GPU is installed
  - Any quantity of LRDIMMs are installed
  - Processor with 16 cores is selected

- Four or more NVMe drives are installed
- In case of failure of a single AC adapter, system will throttle if power budget is above a single adapter capacity
- AC Adapters do not include a line cord. See the next section for available power cords.

Power cords

Line cords and rack power cables can be ordered as listed in the following table.

Table 17. Power cords

Part number	Feature code	Description
39Y7930	6222	2.8m, 10A/250V, C13 to IRAM 2073 (Argentina) Line Cord
81Y2384	6492	4.3m 10A/220V, C13 to IRAM 2073 (Argentina) Line Cord
39Y7924	6211	2.8m, 10A/250V, C13 to AS/NZ 3112 (Australia/NZ) Line Cord
81Y2383	6574	4.3m, 10A/230V, C13 to AS/NZS 3112 (Aus/NZ) Line Cord
69Y1988	6532	2.8m, 10A/250V, C13 to NBR 14136 (Brazil) Line Cord
81Y2387	6404	4.3m, 10A/250V, C13 - 2P+Gnd (Brazil) Line Cord
39Y7928	6210	2.8m, 220-240V, C13 to GB 2099.1 (China) Line Cord
81Y2378	6580	4.3m, 10A/220V, C13 to GB 2099.1 (China) Line Cord
39Y7918	6213	2.8m, 10A/250V, C13 to DK2-5a (Denmark) Line Cord
81Y2382	6575	4.3m, 10A/230V, C13 to DK2-5a (Denmark) Line Cord
39Y7917	6212	2.8m, 10A/230V, C13 to CEE7-VII (Europe) Line Cord
81Y2376	6572	4.3m, 10A/230V, C13 to CEE7-VII (Europe) Line Cord
39Y7927	6269	2.8m, 10A/250V, C13(2P+Gnd) (India) Line Cord
81Y2386	6567	4.3m, 10A/240V, C13 to IS 6538 (India) Line Cord
39Y7920	6218	2.8m, 10A/250V, C13 to SI 32 (Israel) Line Cord
81Y2381	6579	4.3m, 10A/230V, C13 to SI 32 (Israel) Line Cord
39Y7921	6217	2.8m, 220-240V, C13 to CEI 23-16 (Italy/Chile) Line Cord
81Y2380	6493	4.3m, 10A/230V, C13 to CEI 23-16 (Italy/Chile) Line Cord
46M2593	A1RE	2.8m, 12A/125V, C13 to JIS C-8303 (Japan) Line Cord
4L67A08357	6533	2.8m, 200V, C13 to JIS C-8303 (Japan) Line Cord
39Y7926	6335	4.3m, 12A/100V, C13 to JIS C-8303 (Japan) Line Cord
4L67A08362	6495	4.3m, 12A/200V, C13 to JIS C-8303 (Japan) Line Cord
39Y7922	6214	2.8m, 10A/250V, C13 to SABS 164 (S Africa) Line Cord
81Y2379	6576	4.3m, 10A/230V, C13 to SABS 164 (South Africa) Line Cord
39Y7925	6219	2.8m, 220-240V, C13 to KETI (S Korea) Line Cord
81Y2385	6494	4.3m, 12A/220V, C13 to KSC 8305 (S. Korea) Line Cord
39Y7919	6216	2.8m, 10A/250V, C13 to SEV 1011-S24507 (Swiss) Line Cord
81Y2390	6578	4.3m, 10A/230V, C13 to SEV 1011-S24507 (Sws) Line Cord
23R7158	6386	2.8m, 10A/125V, C13 to CNS 10917-3 (Taiwan) Line Cord
81Y2375	6317	2.8m, 10A/240V, C13 to CNS 10917-3 (Taiwan) Line Cord
4L67A08363	AX8B	4.3m, 10A 125V, C13 to CNS 10917 (Taiwan) Line Cord
81Y2389	6531	4.3m, 10A/250V, C13 to 76 CNS 10917-3 (Taiwan) Line Cord
39Y7923	6215	2.8m, 10A/250V, C13 to BS 1363/A (UK) Line Cord

Part number	Feature code	Description
81Y2377	6577	4.3m, 10A/230V, C13 to BS 1363/A (UK) Line Cord
90Y3016	6313	2.8m, 10A/120V, C13 to NEMA 5-15P (US) Line Cord
4L67A08359	6370	4.3m, 10A/125V, C13 to NEMA 5-15P (US) Line Cord
4L67A08361	6373	4.3m, 10A/250V, C13 to NEMA 6-15P (US) Line Cord
46M2592	A1RF	2.8m, 10A/250V, C13 to NEMA 6-15P Line Cord
Rack jumper cables for AC adapters		
00Y3043	A4VP	1.0m, C13 to C14 Jumper Cord, Rack Power Cable
4L67A08365	B0N4	2.0m, 10A/100-250V, C13 to C14 Jumper Cord
4L67A08366	6311	2.8m, 10A/100-250V, C13 to C14 Jumper Cord
39Y7937	6201	1.5m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable
39Y7932	6263	4.3m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable

Software

The systems support the following hypervisors that are installed on the 2x M.2 SSDs configured in a RAID-1 drive group:

- Nutanix AHV 20190916.x
- Nutanix AHV 20201105.x
- Nutanix AHV 20220304.420
- VMware ESXi 6.7 U3
- VMware ESXi 7.0 U2
- VMware ESXi 7.0 U3

The following table lists the hypervisors available for selection.

Table 18. Hypervisors

Description	Feature code	Quantity
Nutanix SW Stack on Nutanix AHV (default selection)	B15S	1
Nutanix SW Stack on VMware ESXi 6.7 U3	BFT7	1

Configuration notes:

- The HX Certified Node support the Nutanix Software Starter, Pro and Ultimate Editions.

- The HX1021 Certified Nodes require the AOS version 5.17.1.3 or later.

- The HX1021 Certified Nodes can be deployed as a single-node cluster, a dual-node cluster, or as a cluster of 3 or more nodes.
    - Dual-node clusters require a witness VM located outside of the cluster.
    - The following Nutanix software features are not supported on single- and dual-node clusters:
        - Cluster expansion
        - Replication Factor 3
        - Deduplication
        - Erasure Coding
        - Acropolis File Services
        - Acropolis Block Services
        - Synchronous replication
        - Metro availability

Nutanix licenses on certified nodes : The certified node ships with the Nutanix software preloaded, however Nutanix software licenses and software support are not included. Customers can use the existing Nutanix term-based software licenses and active support contracts, or they can purchase term-based software licenses and support contracts from Nutanix.

For the information on appliance firmware levels, hypervisor versions, and software versions that have been tested for interoperability, refer to the Lenovo ThinkAgile HX Series Best Recipes: http://datacentersupport.lenovo.com/us/en/solutions/ht505413

Systems management

The HX1021 contains an integrated service processor, XClarity Controller (XCC), which provides advanced control, monitoring, and alerting functions. The XCC is based on the Pilot4 XE401 baseboard management controller (BMC) using a dual-core ARM Cortex A9 service processor.

Topics in this section:

- Activation

- Local management
- Lenovo XClarity Mobile
- Remote management
- Lenovo XClarity Administrator
- Lenovo XClarity Essentials
- Lenovo XClarity Energy Manager

Activation

Activation is an optional security feature of the that ensures that the system delivered from the factory is only used by its intended recipient and that all data and applications remains secure. Activation is enabled on a factory order when the Security Pack Enabled feature code (feature BLZ2) is selected as described in the Security Pack section.

Enabled by default: Activation is enabled by default for new CTO orders. Activation can be disabled in the factory order as described in the Security Pack section.

If Activation is enabled, the system is delivered in system lockdown and will require activation before operation. There are three ways the server can be activated:

- Using a mobile device (iOS or Android) connect to the server to the USB management port on the front of the server and running the ThinkShield Edge Mobile Management app .
- Connecting the system to the Internet via the XCC management port on the front of the server and accessing the ThinkShield Key Vault Portal from a web browser on another system.
- In a disconnected mode, where neither a mobile device or an internet connection to the are available.

Details of the activation process are described in the following documents:

- Activation Guide (2-page flyer that is included with the server)
- SE350 Setup Guide, Chapter 4

These documents are available from:
https://thinksystem.lenovofiles.com/help/topic/SE350/pdf_files.html?cp=2_0_0

For further information on activation and the use of the ThinkShield Edge Mobile Management app, including videos and tours, see this support page:
https://support.lenovo.com/us/en/solutions/ht509033

Local management

The HX1021 offers a front operator panel with key LED status indicators, as shown in the following figure.
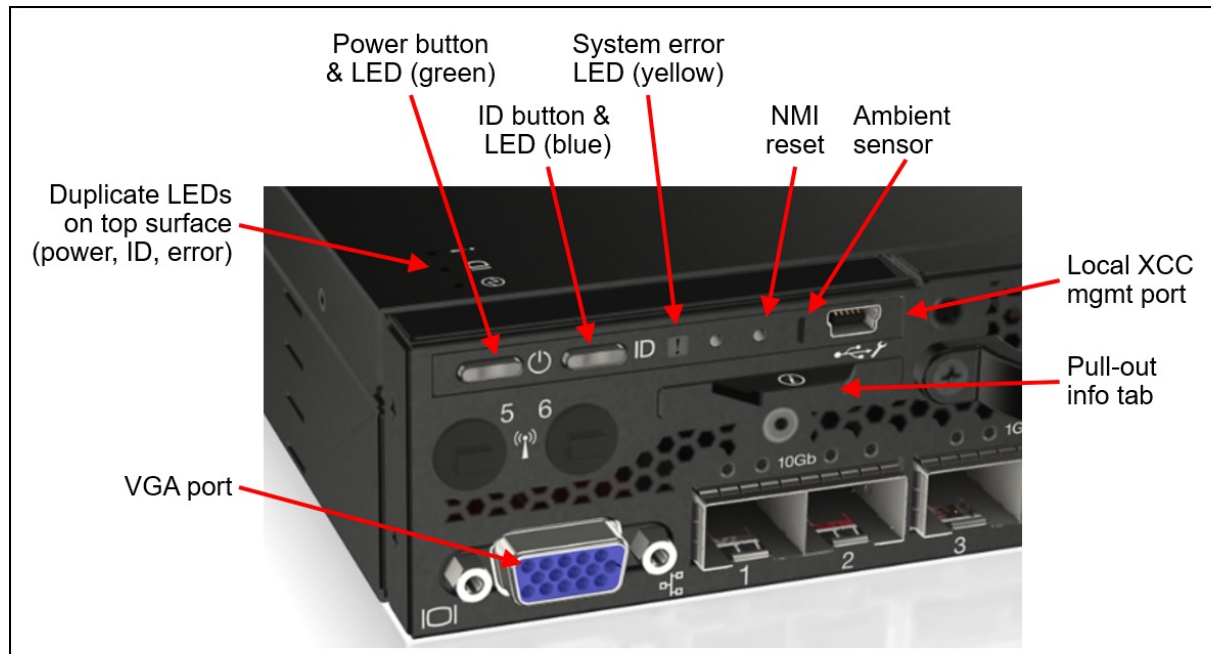

Figure 13. Front operator panel

The buttons on the front of the server:

- Power button
- Identification button - turns on the LED housed within the button as well as passing the signal to the XCC for display remotely in XClarity Administrator
- NMI reset pinhole - sends a NMI signal to the processor thereby causing a blue-screen trap of the operating system

The LEDs on the front of the server are as follows:

- Power LED (green) - indicated activation and power status, as follows:
  - Off - Server does not have power applied
  - Fast flash (4 times per second) - Either server has just had power applied and is not ready to be powered on yet, or the server has not been activated yet
  - Slow flash (once per second) - Server is ready to be powered on
  - On solid - Server is powered on
- Identification LED (blue) - lights when the button is pressed or when the function is activated remotely in XClarity Controller.
- System error LED (yellow)

The front of the server also houses an information pull-out tab (also known as the network access tag). See Figure 2 for the location. A label on the tab shows the network information (MAC address and other data) to remotely access the XCC service processor.

System status with XClarity Mobile

The HX1021 also supports local systems management using the XClarity Mobile app. The app includes a tethering function where you can connect your Android or iOS device to the server via the micro-USB port on the server.

You will need a mobile device with a supported operating system installed (iOS 12 or later, Android 5.0 or later), plus the USB charging cable that comes with your phone. You will also need the USB-to-mini-USB cable that ships with the system.

The steps to connect the mobile device are as follows:

1. Connect the mobile device via your USB cable and the supplied USB-to-mini-USB cable to the HX1021's mini-USB port with the management symbol
2. In iOS or Android settings, enable Personal Hotspot or USB Tethering
3. Launch the Lenovo XClarity Mobile app

Once connected you can see the following information:

- Server status including error logs (read only, no login required)
- Server management functions (XClarity login credentials required)

Remote management

Remote server management is provided through industry-standard interfaces:

- Intelligent Platform Management Interface (IPMI) Version 2.0
- Simple Network Management Protocol (SNMP) Version 3 (no SET commands; no SNMP v1)
- Common Information Model (CIM-XML)
- Representational State Transfer (REST) support
- Redfish support (DMTF compliant)
- Web browser - HTML 5-based browser interface (Java and ActiveX not required) using a responsive design (content optimized for device being used - laptop, tablet, phone) with NLS support

Remote management is available via the following connections:

- Via the dedicated Ethernet ports for management. The wired network modules have a dedicated RJ45 Ethernet port for remote management. See the Network Modules section for the location of these ports.
- Via Port 1 of the 10 GbE SFP+ ports supports NC-SI to allow sharing of the Ethernet port between the operating system and remote management.

The HX1021 has XCC Enterprise as a standard feature. XCC Enterprise includes a virtual presence (remote control and remote media) capability for remote server management.

The remote control functions include the following:

- Remotely viewing video with graphics resolutions up to 1600x1200 at 75 Hz with up to 23 bits per pixel, regardless of the system state
- Remotely accessing the server using the keyboard and mouse from a remote client
- Capturing blue-screen errors
- International keyboard mapping support
- LDAP-based authentication
- Boot Capture

- Remote mounting of ISO and IMG files
- Virtual console collaboration - Ability for up to 6 remote users to be log into the remote session simultaneously
- Power capping
- License for XClarity Energy Manager

Lenovo XClarity Administrator

Lenovo XClarity Administrator is a centralized resource management solution designed to reduce complexity, speed response, and enhance the availability of Lenovo systems and solutions.

Lenovo XClarity Administrator provides agent-free hardware management for ThinkSystem servers, in addition to ThinkServer, System x, and Flex System servers. The administration dashboard is based on HTML 5 and allows fast location of resources so tasks can be run quickly.

Because Lenovo XClarity Administrator does not require any agent software to be installed on the managed endpoints, there are no CPU cycles spent on agent execution, and no memory is used, which means that up to 1GB of RAM and 1 - 2% CPU usage is saved, compared to a typical managed system where an agent is required.

Lenovo XClarity Administrator provides management function to systems, including the following:

- Discovery
- Inventory
- Monitoring and alerting
- Call home
- Centralized user management
- Cryptography modes, server certificates, and encapsulation
- Firmware updates

For more information about Lenovo XClarity Administrator, including ordering part numbers, see the Lenovo XClarity Administrator Product Guide: https://lenovopress.com/tips1200-lenovo-xclarity-administrator

Lenovo XClarity Essentials

Lenovo offers the following XClarity Essentials software tools that can help you set up, use, and maintain the server at no additional cost:

- Lenovo Essentials OneCLI

  OneCLI is a collection of server management tools that uses a command line interface program to manage firmware, hardware, and operating systems. It provides functions to collect full system health information (including health status), configure system settings, and update system firmware and drivers.

- Lenovo Essentials UpdateXpress

  The UpdateXpress tool is a standalone GUI application for firmware and device driver updates that enables you to maintain your server firmware and device drivers up-to-date and help you avoid unnecessary server outages. The tool acquires and deploys individual updates and UpdateXpress System Packs (UXSPs) which are integration-tested bundles.

- Lenovo Essentials Bootable Media Creator

  The Bootable Media Creator (BOMC) tool is used to create bootable media for offline firmware update.

For more information and downloads, visit the Lenovo XClarity Essentials web page: http://support.lenovo.com/us/en/documents/LNVO-center

Lenovo XClarity Energy Manager

Lenovo XClarity Energy Manager (LXEM) is a power and temperature management solution for data centers. It is an agent-free, web-based console that enables you to monitor and manage power consumption and temperature in your data center through the management console. It enables server density and data center capacity to be increased through the use of power capping.

LXEM is a licensed product. A single-node LXEM license is included with the XClarity Controller Enterprise upgrade as described in the Remote Management section. If your server does not have the XCC Enterprise upgrade, Energy Manager licenses can be ordered as shown in the following table.

Table 19. Lenovo XClarity Energy Manager

Part number	Description
4L40E51621	Lenovo XClarity Energy Manager Node License (1 license needed per server)

For more information about XClarity Energy Manager, see the following resources:

- Lenovo Support page:
  https://datacentersupport.lenovo.com/us/en/solutions/lnvo-lxem
- User Guide for XClarity Energy Manager:
  https://pubs.lenovo.com/lxem/

Security

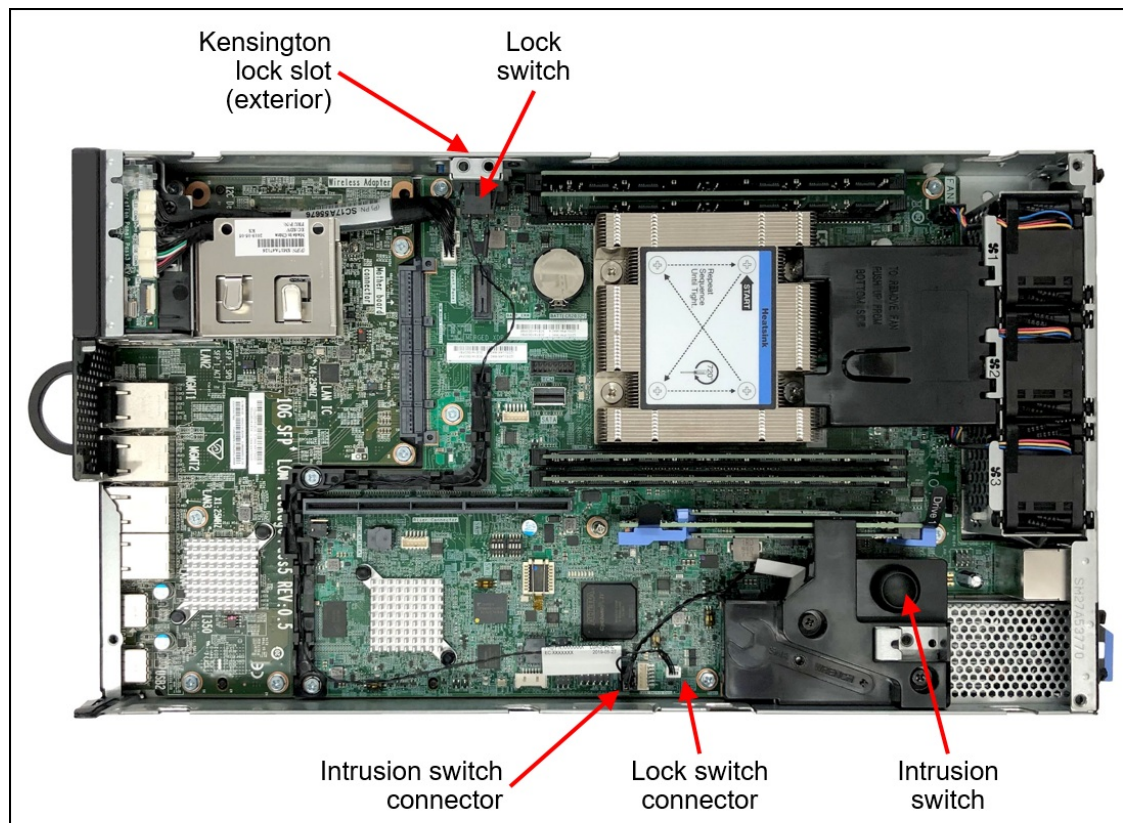The HX1021 offers a number of security features, both electronic and physical.

Figure 14. Security features of the H1021

Physical security features:

- Intrusion detection

  The server has an intrusion switch that rests against the server cover. In the event that the cover is removed, the event is recorded and actions can be taken to secure the server. The intrusion switch is standard.

- Motion detection

  The server has an onboard G-sensor accelerometer (disabled by default) that will generate an event if the server is moved. As part of the setup process in XCC, you specify the orientation of the server - desktop, ceiling, wall mount. You can also specify the sensitivity of the motion detection. The motion detection feature is standard.

- Support for a Kensington lock and cable

  The server has a slot on the side of the server which a customer-supplied Kensington lock and cable can be attached to, to help prevent theft of the server.

- Intrusion arm/disarm feature

  The Kensington cable slot can also double as an electronic switch to disarm the intrusion switch detection, so that authorized servicing of the hardware can be performed without triggering the security actions. Available as the Tamper Detection Kit, CTO only. The kit includes a Kensington lock (without cable) that is attached to the outside of the server.

  Note: This intrusion arm/disarm feature is not supported with the 1U or 2U rack enclosure mounting options, due to physical restrictions with the Kensington lock.

- Front bezel with key lock

  Optional component that mounts on the front of the server that restricts access to networking connectors on the front of the server. See Mounting components for more information.

Electronic security features include:

- Automatic actions on tamper detection

  In the event of an intrusion or movement, the server can be configured in XCC to perform actions, including server shutdown and disabling remote access to the XCC from the network ports (referred to as the BMC network bridge).

- Self-encrypting (SED) M.2 drives that ensure data is secured when the drives are powered off
- Administrator password and a power-on password in UEFI

The server is NIST SP 800-147B compliant.

Ordering information for the security components is listed in the following table.

Table 20. Security components

Part number	Feature code	Description
CTO only	B6Q2	ThinkSystem SE350 Anti-Tampering Keylock Kit • Internal lock mechanism with electronic switch • Cable and routing tray • Kensington lock with key
4M17A37599	B6GD	ThinkSystem SE350 Sleeve Locking Bezel with Dust Filter Holders (see Mounting components) • Locking security bezel with key • Dust filter holders

Security Pack

The Security Pack is the collection of security and activation features of the HX1021:

- Enablement of local Self-encrypting (SED) authentication key (AK) management
- Mandatory claiming and activation process to identify the owner of HX1021 when the server is first delivered/powered on

Table 21. Security Pack ordering information

Feature code	Description
BLZ2	ThinkEdge Security Pack Enabled
BKFC	ThinkEdge Security Pack Disabled

Notes:

- The Security Pack features setting cannot be changed after the system leaves the factory. For example, if you select feature BLZ2 to enable the Security Pack features, then the system will *require* activation before it can be first used. Similarly, if your system was configured in the factory with Security Pack disabled, you cannot enable it at a later time.
- Customers can use the ThinkShield Portal to determine which of their systems have Security Pack enabled or disabled (you will see "Standard" if the system has Security Pack disabled).

Intel Transparent Supply Chain

Add a layer of protection in your data center and have peace of mind that the server hardware you bring into it is safe authentic and with documented, testable, and provable origin.

Lenovo has one of the world's best supply chains, as ranked by Gartner Group, backed by extensive and mature supply chain security programs that exceed industry norms and US Government standards. Now we are the first Tier 1 manufacturer to offer Intel® Transparent Supply Chain in partnership with Intel, offering you an unprecedented degree of supply chain transparency and assurance.

To enable Intel Transparent Supply Chain for the Intel-based servers in your order, add the following feature code in the DCSC configurator, under the Security tab.

Table 22. Intel Transparent Supply Chain ordering information

Feature code	Description
BB0P	Intel Transparent Supply Chain

For more information on this offering, see the paper *Introduction to Intel Transparent Supply Chain on Lenovo ThinkSystem Servers*, available from https://lenovopress.com/lp1434-introduction-to-intel-transparent-supply-chain-on-thinksystem-servers.

Mounting options

The HX1021 is designed to be used in a variety of locations -- wall, ceiling, table top -- as well as in a rack.

In this section:

- Mounting components
- Desktop mount
- Stacked mount
- Wall or ceiling mount
- 1U rack installation
- Short-depth 2U rack installation

Mounting components

Many of the mounting options share the same components.

Node sleeve

The node sleeve, shown below, holds the HX1021 when mounted on the wall or connected to other HX1021 servers. Multiple HX1021 servers can be connected together -- the node sleeves are clipped together and then secured using thumbscrews. The servers are then slid into the node sleeves and secured with additional thumbscrews.
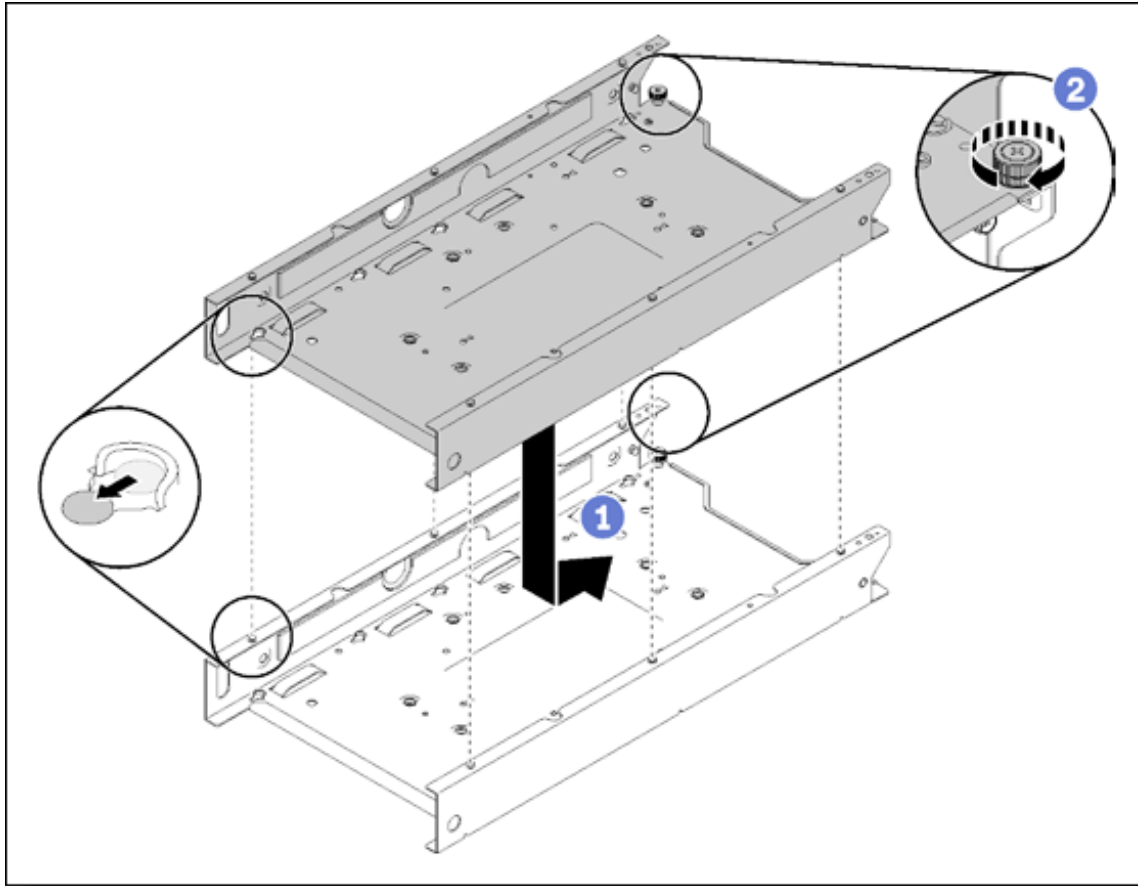
Figure 15. Attaching two node sleeves together

Table 23. Node Sleeve ordering information

Part number	Feature code	Description	Quantity required
4M17A37607	B6EZ	ThinkSystem SE350 Node Sleeve	1 per server

Locking bezel

The locking bezel (4M17A37599) is an optional component that mounts on the front of the node sleeve to help prevent physical access to the front components of the server. The bezel includes a lock-and-key mechanism for security. The bezel also includes two brackets that are used to hold the optional dust filters (4M17A37602). The brackets and filters cover the PCIe slot area and the network area to reduce the dust that can enter the server through the front air holes.

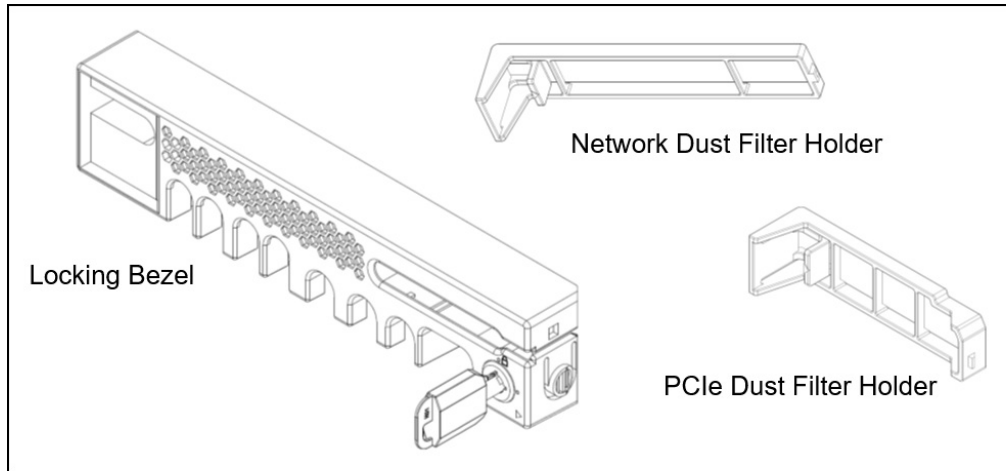> **Tip**: The use of the locking bezel requires a node sleeve.

Figure 16. Locking Bezel and Filter Holders (4M17A37599)

Table 24. Locking bezel ordering information

Part number	Feature code	Description	Quantity required
4M17A37599	B6GD	ThinkSystem SE350 Sleeve Locking Bezel with Dust Filter Holders • Locking bezel with key • Dust filter holder for the area above the network ports • Dust filter holder for PCIe slot area	Optional, 1 per server
4M17A37602	B6KU	ThinkSystem SE350 Locking Bezel Dust Filter • 1x 5mm foam dust filter for network filter holder • 1x 5mm foam dust filter for PCIe filter holder	Optional, 1 per server

Desktop mount

Desktop mounting has the server oriented horizontally with self-adhesive rubber pads mounted to its underside.
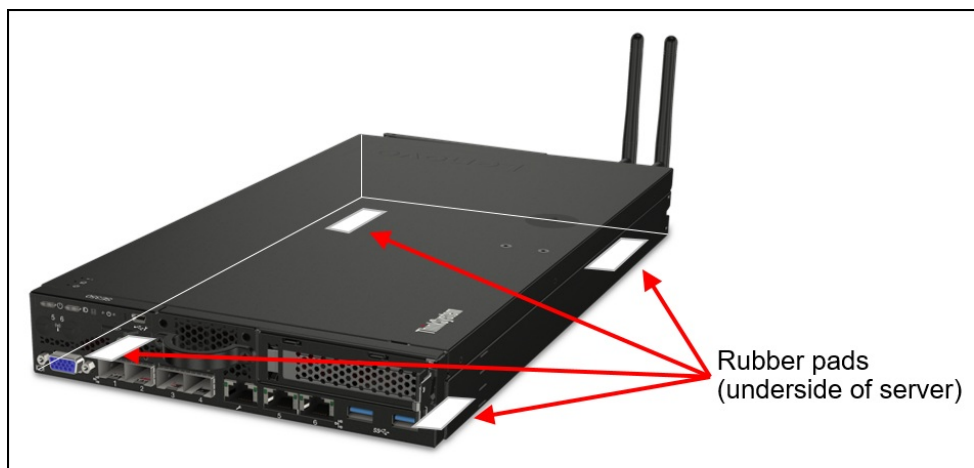

Figure 17. HX1021 with Rubber Feet option

The rubber feet are included with the Node Sleeve, 4M17A37607, but are also orderable separately as listed in the following table.

Table 25. Desktop mount components

Part number	Feature code	Description	Quantity required
4M17A37610	B6Q3	ThinkSystem SE350 Rubber Feet (contains 4 rubber pads) (also included in the Node Sleeve, 4M17A37607)	1

Stacked mount

Multiple HX1021 servers can be each installed into a node sleeve and then stacked horizontally up to 3 high. The node sleeves are secured together using thumbscrews. The bottom node sleeve has rubber feet mounted to its underside.

The components needed for the stacked mount are shown in the following table. See the Mounting components section for details about the node sleeve and locking bezel.

Table 26. Stacked mount components

Part number	Feature code	Description	Quantity required
4M17A37607	B6EZ	ThinkSystem SE350 Node Sleeve (includes 4 rubber pads)	1 per server
4M17A37599	B6GD	ThinkSystem SE350 Sleeve Locking Bezel with Dust Filter Holders	Optional, 1 per server
4M17A37602	B6KU	ThinkSystem SE350 Locking Bezel Dust Filter	Optional, 1 per server

Wall or ceiling mount

The HX1021 can be mounted on a wall or the ceiling, using the node sleeve. When wall mounted, the node sleeve can be mounted directly on the wall or onto a DIN rail. The server is then installed in the sleeve.

The components needed for a wall or ceiling mount are shown in the following table. See the Mounting components section for details about the node sleeve and locking bezel.

Table 27. Wall or ceiling mount

Part number	Feature code	Description	Quantity required
4M17A37607	B6EZ	ThinkSystem SE350 Node Sleeve	1 per server
4M17A37601	B6F0	ThinkSystem SE350 AC Adapter Bracket	1 per server
4M17A37600	B6F1	ThinkSystem SE350 DIN Rail Kit (contains two brackets)	Optional, for DIN rail only, 1 per server
4M17A37285	B87S	ThinkSystem SE350 DIN Mount Kit (Extreme Shock & Vibe) (ruggedized, contains two brackets)	Optional, for DIN rail only, 1 per server
4M17A37599	B6GD	ThinkSystem SE350 Sleeve Locking Bezel with Dust Filter Holders	Optional, 1 per server
4M17A37602	B6KU	ThinkSystem SE350 Locking Bezel Dust Filter	Optional, 1 per server

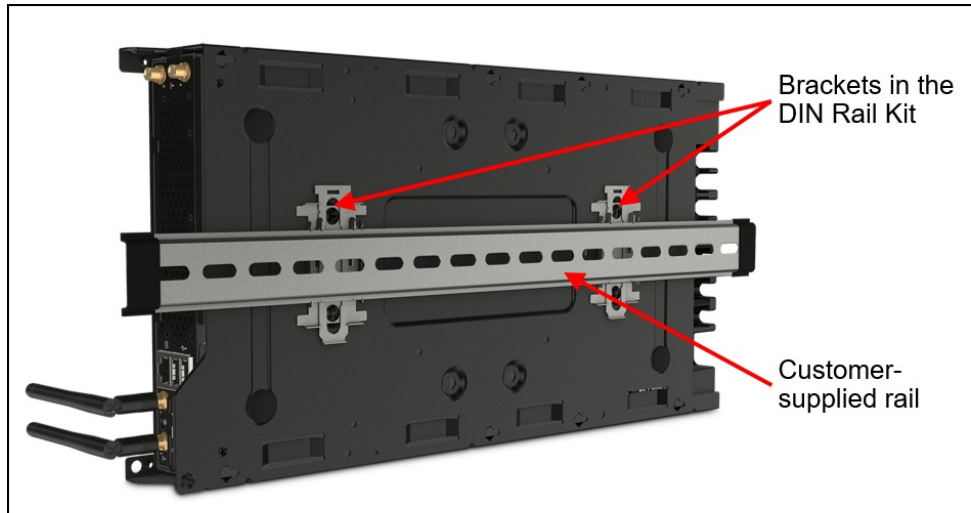The DIN Rail Kit contains two brackets, as shown in the following figure.

Figure 18. DIN Rail Kit

The AC Adapter Bracket houses the two AC adapters for the HX1021 server, as shown in the following figure.
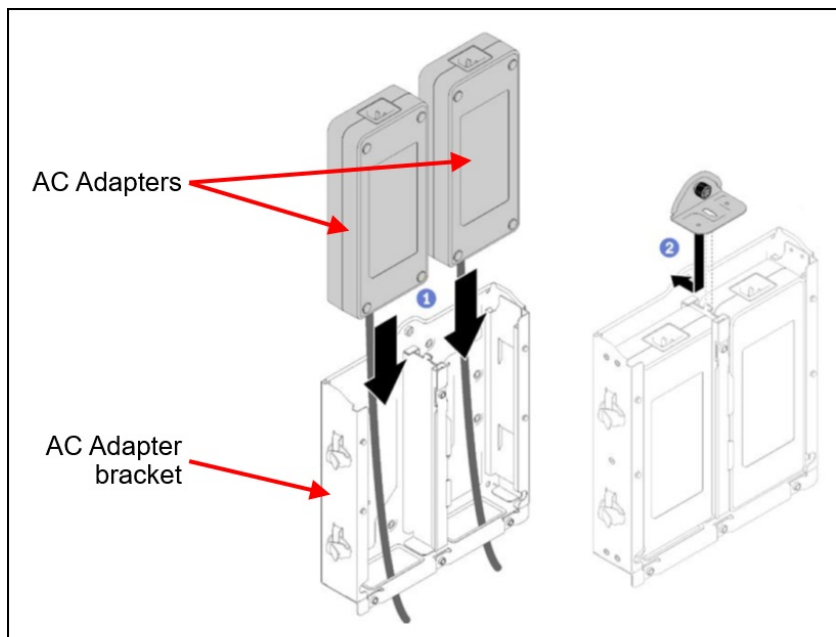
Figure 19. AC Adapter Bracket

When mounting on a DIN rail, the AC Adapter Bracket and Node Sleeve can be mounted side by side, or they can be mounted one on top of the other, where the AC Adapter Bracket attaches to the DIN rail, and the Node Sleeve mounts to the AC Adapter Bracket.

1U rack installation

Two HX1021 servers and the four companion AC Adapter power supplies can be mounted in a 1U space in a rack server. The components are mounted in the ThinkAgile E1 Enclosure, machine type 7D22.

Notes: The ThinkAgile E1 Enclosure is available in DCSC using CTO base model 7D22CTO5WW. In some markets it may also be available as a preconfigured model.

The following figure shows two HX1021 servers installed in the E1 Enclosure.
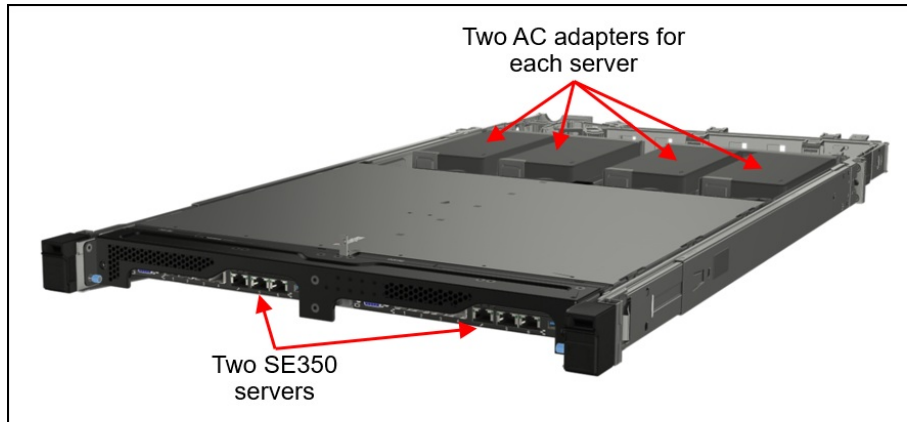

Figure 20. ThinkAgile E1 Enclosure

The following figure shows the components used in the 1U rack installation.
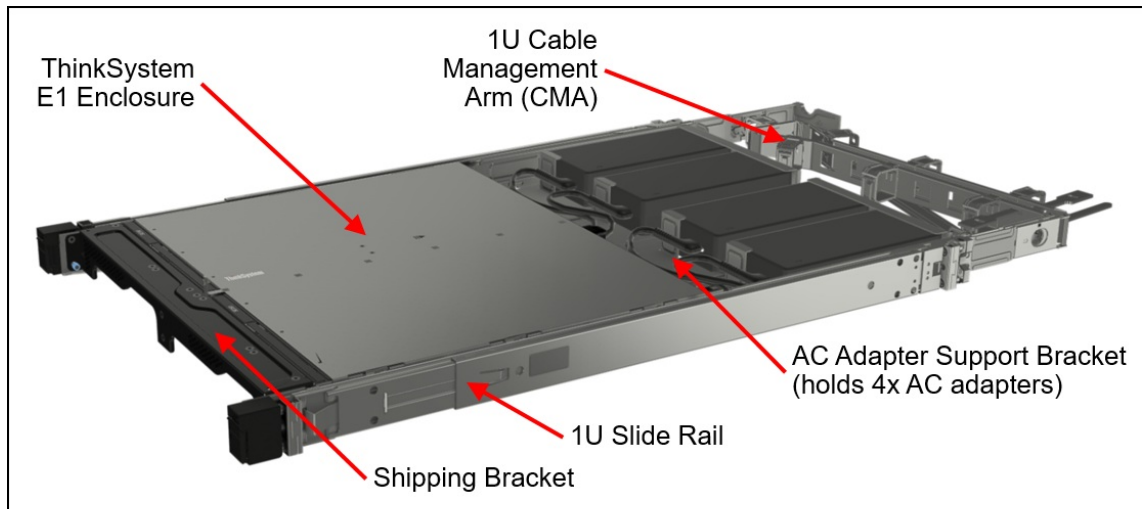

Figure 21. ThinkAgile E1 Enclosure components

The following table lists the components used in the 1U rack installation.

Tip: The top cover of the HX1021 is removed before installing the server in the enclosure.

Table 28. Components for the E1 Enclosure

Part number	Feature code	Description	Quantity required
Toolless Slide Rail Kit and CMA			
4M17A11683	7D1R AVAL	1U and 2U Slide Rail	1 per Enclosure
CTO only	7D1R AVAX	CMA (1U)	1 per Enclosure
ThinkSystem E1 Enclosure components			
CTO only	7D1R B6PX	ThinkSystem Enclosure for Mounting SE350 Side by Side in Rack	1 per Enclosure
CTO only	7D1R B6EE	ThinkSystem Enclosure AC Adapter Support Bracket	1 per Enclosure
4M17A37283	7D1R B6F2	ThinkSystem Enclosure Front Shipping Bracket ● 1x Front Shipping/Dust Filter Bracket ● 2x Rack Filter Holders	1 per Enclosure
4M17A37284	7D1R B6PY	ThinkSystem Enclosure Rack Dust Filter ● 1x 5mm foam dust filter for network filter holder ● 1x 5mm foam dust filter for PCIe filter holder	1 for each server

The following figure shows the components included in the Front Shipping Bracket.

Figure 22. ThinkSystem Enclosure Front Shipping Bracket

The following table summarizes the specifications of the two available rail kits

Table 29. Specifications of rail kit for E1 Enclosure

Feature	Slide Rail Kit
Part number	4M17A11683
CMA	Optional, CTO only (7D1R AVAX)
Rail length	807 mm (31.8 in.)
Rail type	Full-out slide (ball bearing)
Slide travel	810 mm (31.9 in.)
Tool-less installation	Yes

Feature	Slide Rail Kit
In-rack server maintenance	Yes
1U PDU support	Yes
0U PDU support	Yes
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.)
Max distance between front and rear mounting flanges	864 mm (34.0 in.)

Short-depth 2U rack installation

Two HX1021 servers and the four companion AC Adapter power supplies can also be mounted in a short-depth rack or a 2-post rack. In such a configuration, the servers occupy 2U of rack space, the two servers in 1U and the AC Adapters mounted in the 1U space above. The components are mounted in the ThinkAgile E2 Enclosure, machine type 7D22.

Notes: The E2 Enclosure is available in DCSC using CTO base model 7D22CTO6WW. In some markets it may also be available as a preconfigured model.

The following figure shows two HX1021 servers installed in the E2 Enclosure.
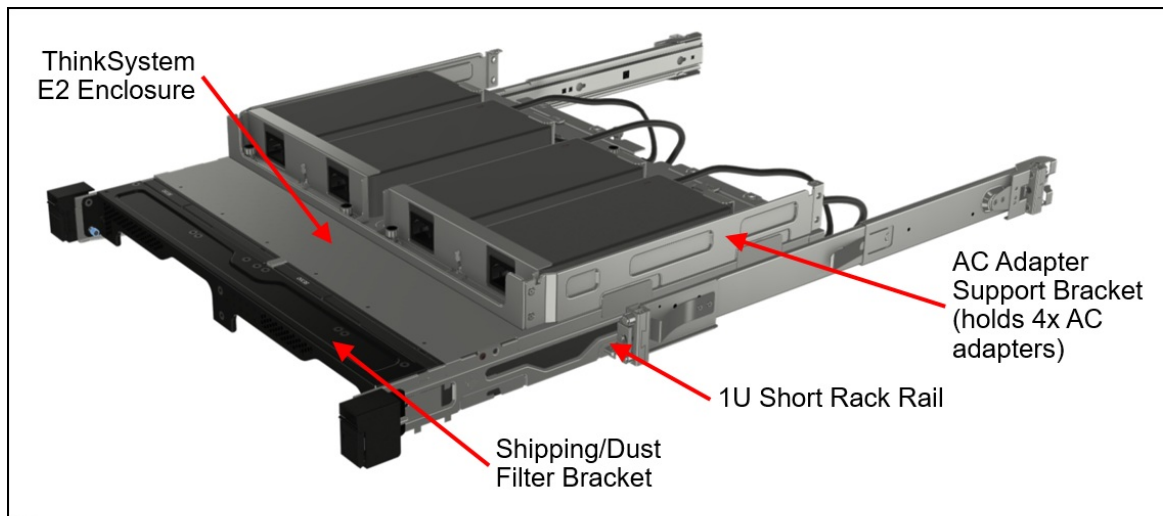

Figure 23. ThinkAgile E2 Enclosure components (rail in open position)

The following table lists the components used in the 1U rack installation.

Tip: The top cover of the HX1021 is removed before installing the server in the enclosure.

Table 30. Components for the E2 Enclosure

Part number	Feature code	Description	Quantity required
Rail kit selections (choose 1)			
4M17A37105	7D1R B6H2	ThinkSystem Friction 2-Post Screw-in Rail Kit	1 per enclosure
4M17A37605	7D1R B7L3	ThinkSystem Enclosure Short Rack Rail Kit	1 per enclosure
ThinkSystem E2 Enclosure components			
CTO only	7D1R B6PX	ThinkSystem Enclosure for Mounting SE350 Side by Side in Rack	1 per Enclosure
CTO only	7D1R B6EE	ThinkSystem Enclosure AC Adapter Support Bracket	1 per Enclosure
4M17A37283	7D1R B6F2	ThinkSystem Enclosure Front Shipping Bracket • 1x Front Shipping/Dust Filter Bracket • 2x Rack Filter Holders	1 per Enclosure
4M17A37284	7D1R B6PY	ThinkSystem Enclosure Rack Dust Filter • 1x 5mm foam dust filter for network filter holder • 1x 5mm foam dust filter for PCIe filter holder	1 for each server

The following figure shows the components included in the Front Shipping Bracket.

Figure 24. ThinkSystem Enclosure Front Shipping Bracket

The following table summarizes the specifications of the two available rail kits

Table 31. Specifications of rail kits for short-depth installations

Feature	Short Rack Rail Kit	2-Post Screw-in Rail Kit
Part number	4M17A37605	4M17A37105
CMA	None	None
Rail length	484 mm (19.1 in.)	484 mm (19.1 in.)
Rail type	Half-out slide (friction)	Half-out slide (friction)
Slide travel	270 mm (10.6 in.)	270 mm (10.6 in.)
Tool-less installation	Yes	No

Feature	Short Rack Rail Kit	2-Post Screw-in Rail Kit
In-rack server maintenance	No	No
1U PDU support	Yes	Yes
0U PDU support	Yes	Not applicable
Rack type	14-inch to 24-inch depth	2-post, EIA standard-compliant (3-inch to 8-inch)
Mounting holes	Square or round	Square, round, or threaded
Mounting flange thickness	2 mm (0.08 in.) – 3.3 mm (0.13 in.)	2 mm (0.08 in.) – 3.3 mm (0.13 in.)
Max distance between front and rear mounting flanges	810 mm (31.9 in.)	Not applicable

Operating system support

The HX1021 supports the following operating systems:

- Nutanix AHV 20190916
- VMware ESXi 6.7 U3

Physical and electrical specifications

Dimensions and weight of the HX1021 server:

- Height 43 mm (1.7 in.)
- Width: 209 mm (8.2 in.)
- Depth: 376 mm (14.8 in.)
- Maximum weight: 3.6 kg (7.9 lbs)

Dimensions and weight of the E1 Enclosure (without CMA and front bracket):

- Height: 43 mm (1.7 in.)
- Width: 434 mm (17.1 in.)
- Depth: 736 mm (29.0 in.)
- Weight: 10 kg (with 2 power supplies), 15 kg (with 4 power supplies)

Dimensions and weight of the E2 Enclosure (without front bracket):

- Height: 87 mm (3.4 in.)
- Width: 434 mm (17.1 in.)
- Depth: 441 mm (17.3 in.)
- Weight: 10 kg (with 2 power supplies), 15 kg (with 4 power supplies)

Electrical specifications:

- Electrical Input - 12V AC Adapters
    - 100 to 127 (nominal) V AC, 50 Hz or 60 Hz, 3.2 A
    - 200 to 240 (nominal) V AC, 50 Hz or 60 Hz, 1.6 A

Operating environment

The HX1021 complies with ASHRAE A4 specifications 5°C to 45°C (41°F to 113°F). System performance may be impacted when operating temperature is outside ASHRAE A4 specification or in the event of a fan failure.

The server is supported in the following environment:

- Air temperature:
  - Operating: ASHRAE Class A4: 5°C to 45°C (41°F to 113°F); the maximum ambient temperature decreases by 1°C for every 125 m (410 ft) increase in altitude above 900 m (2,953 ft).
  - Server off: 5°C to 45°C (41°F to 113°F)
  - Shipment/storage: -40°C to 60°C (-40°F to 140°F)
  - With the following configuration restrictions, the HX1021 can operate 0°C to 55°C ambient temperature:
    - No GPU
- Maximum altitude: 3,050 m (10,000 ft)
- Relative Humidity (non-condensing):
  - Operating: ASHRAE Class A4: 8% to 90%; maximum dew point: 24°C (75°F)
  - Shipment/storage: 8% to 90%
  - Non-operating (unpacked) storage: 5% to 95% at 38.7°C (101.7°F) maximum dry-bulb temperature for 48 hrs.

The server generates the following heat:

- Heat/thermal output:
  - Minimum configuration: 287 BTU per hour (84 watts)
  - Maximum configuration: 783 BTU per hour (229 watts)

The server has the following acoustic noise emissions declaration:

- Sound power level (L_{WAd}):
  - Idling: 4.6 Bel (typical), 5.4 Bel (maximum)
  - Operating: 5.3 Bel (typical), 6.5 Bel (maximum)
- Sound pressure level (L_{pAm}):
  - Idling: 34 dBA (typical), 41 dBA (maximum)
  - Operating: 40 dBA (typical), 51 dBA (maximum)

Notes:

1. These sound levels were measured in controlled acoustical environments according to procedures specified by ISO7779 and are reported in accordance with ISO 9296.

2. The declared acoustic sound levels are based on specified configurations, which may change slightly depending on configuration/conditions, for example GPU cards such as the NVIDIA T4.

The server has the vibration and shock limits listed in the following table for when the server is in operation. The terms "left wing" and "right wing" in the table refer to the two sides of the riser card as described in the I/O expansion section.

Table 32. Vibration and shock values - server operation

Riser configuration		Vibration limit	Shock limit
Left wing	Right wing		
NVMe	NVMe	3.0 G rms, 3-500 Hz, 60 min/axis	30 G, 11ms, half-sine, or 40 G, 6ms ±X, ±Y, ±Z
NVMe	GPU	3.0 G rms, 3-500 Hz, 60 min/axis	30 G, 11ms, half-sine, or 40 G, 6ms ±X, ±Y, ±Z

Non-operation shock & vibration data is as follows:

- Vibration, non-operating:
  - Single HX1021 server: 7.7 G rms at 20 - 2000 Hz for 60 minutes across 6 surfaces
  - Rack installation: 1.04 G rms at 2 - 200 Hz for 15 minutes across 6 surfaces
- Shock, non-operating:
  - Single HX1021 server:
    - 50 G for 11ms, square wave, in each direction (±X, ±Y, ±Z axes)
  - Rack installation:
    - 0-4 kg: 50 G for 180 in./sec velocity change across 6 surfaces
    - 4-12 kg: 50 G for 167 in./sec velocity change across 6 surfaces
    - 12-23 kg: 50 G for 152 in./sec velocity change across 6 surfaces
    - 23-32 kg: 35 G for 152 in./sec velocity change across 6 surfaces
    - 32-69 kg: 35 G for 136 in./sec velocity change across 6 surfaces
    - 69-107 kg: 25 G for 118 in./sec velocity change across 6 surfaces

For CTO orders, specify the operational temperature requirement and the shock & vibration requirement, by selecting the feature codes listed in the following table. Selecting the higher temperature and shock/vibration values will ensure the correct heat/vibration tolerant components are selected.

Table 33. Environmental requirements for CTO orders

Feature code	Description
Operational temperature selections	
B8ZT	Operational Temperature 0-45°C
B8ZU	Operational Temperature 0-55°C
Shock & Vibration selections	
B8ZR	Standard Shock & Vibration (15G & .21Grms) • Shock: 15 G, 11ms, half-sine, ±X, ±Y, ±Z • Vibration: 0.21 G rms, 3-500 Hz, 30 mins/axis
B8ZQ	High Shock & Vibration (30G & 3Grms) • Shock: 30 G, 11ms, half-sine, ±X, ±Y, ±Z • Vibration: 3.0 G rms, 3-500 Hz, 15 mins/axis
BCDN	Extreme Shock & Vibration (40G & 3Grms) • Shock: 40 G, 6ms, half-sine, ±X, ±Y, ±Z • Shock: 30 G, 11ms, half-sine, ±X, ±Y, ±Z • Vibration: 3.0 G rms, 3-500 Hz, 60 mins/axis

The following table indicates what environmental conditions (ambient temperature as well as shock & vibration) are supported with the M.2 drives and GPUs.

Table 34. Drive and GPU support based on environmental selections (shock/vibration and ambient temperature)

Part number	Description	Std S&V* + 45°C	Std S&V* + 55°C	High S&V* + 45°C	High S&V* + 55°C	Extreme S&V* +45°C	Extreme S&V* +55°C
SATA M.2 - ATP A600i							
4XB7A39423	M.2 Industrial A600i 480GB SATA SSD	Yes	Yes	Yes	Yes	Yes	Yes
NVMe M.2 - Intel P4511 (drive options include a heatsink)							
4XB7A39426	M.2 650GB P4511 NVMe SED HE SSD	Yes	Yes	No	No	Yes	Yes
GPU							
4X67A14926	NVIDIA Tesla T4 16GB PCIe Passive GPU	Yes	No	Yes	No	Yes	No

* **Standard S&V** refers to 15G for 11ms shock and 0.21 G vibration for 30 minutes. **High S&V** refers to 30G for 11ms shock and 3.0 G vibration for 15 minutes. **Extreme S&V** refers to 40G for 6ms & 30G for 11ms shock, and 3.0 G vibration for 60 minutes.

Warranty and Support

The ThinkAgile HX Certified Nodes can be configured with 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.

For more information refer to the Lenovo Support Plan - ThinkAgile HX Certified Nodes
https://support.lenovo.com/us/en/solutions/HT510301

Hardware warranty

The ThinkAgile HX1021 has a 3-year warranty:

- 7D20 – 3-year warranty

The ThinkAgile E1 and E2 Enclosures have the following warranty:

- 7D22 - 3-year warranty

The standard warranty terms are customer-replaceable unit (CRU) and onsite (for field-replaceable units FRUs only) with standard call center support during normal business hours and 9x5 Next Business Day Parts Delivered.

Lenovo's additional support services provide a sophisticated, unified support structure for your data center, with an experience consistently ranked number one in customer satisfaction worldwide. Available offerings include:

- **Warranty Upgrade (Preconfigured Support)**

  Services are available to meet the on-site response time targets that match the criticality of your 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. YourDrive YourData is an optional extra (see below).
  - **Essential Service:** 24x7 service coverage with 4-hour onsite response or 24-hour committed repair (available only in select markets). Bundled with YourDrive YourData.
  - **Advanced Service:** 24x7 service coverage with 2-hour onsite response or 6-hour committed repair (available only in select markets). Bundled with YourDrive YourData.

- **Managed Services**

  Lenovo Managed Services provides continuous 24x7 remote monitoring (plus 24x7 call center availability) and proactive management of your 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 & OS device driver levels, and software as needed. We'll also maintain records of latest patches, critical updates, and firmware levels, to ensure you systems are providing business value through optimized performance.

- **Technical Account Management (TAM)**

  A Lenovo Technical Account Manager helps you optimize the operation of your data center based on a deep understanding of your business. You gain direct access to your Lenovo TAM, who serves as your single point of contact to expedite service requests, provide status updates, and furnish reports to track incidents over time. In addition, your TAM will help proactively make service recommendations and manage your service relationship with Lenovo to make certain your needs are met.

- **Enterprise Server Software Support**

  Enterprise Software Support is an additional support service providing 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 comparability and interoperability issues, isolate causes of problems, report defects to software vendors, and more.

- **YourDrive YourData**

  Lenovo's YourDrive YourData is a multi-drive retention offering that ensures your data is always under your control, regardless of the number of drives that are installed in your Lenovo server. In the unlikely event of a drive failure, you retain possession of your drive while Lenovo replaces the failed drive part. Your data stays safely on your premises, in your hands. The YourDrive YourData service can be purchased in convenient bundles and is optional with Foundation Service. It is bundled with Essential Service and Advanced Service.

- **Health Check**

  Having a trusted partner who can perform regular and detailed health checks is central to maintaining efficiency and ensuring that your 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.

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 Service offerings are region-specific. Not all preconfigured support and upgrade options are available in every region. For information about Lenovo service upgrade offerings that are available in your region, refer to the following resources:

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

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

- Lenovo Statement of Limited Warranty for Infrastructure Solutions Group (ISG) 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

For custom Hardware Installation and Deployment Services, please contact the Lenovo Professional Services team for sizing and pricing:

- North America (USA, Canada): dcg_ps_na@lenovo.com

- Asia Pacific + PRC: dcg_ps_ap@lenovo.com

- Latin America (Brazil, Mexico, SSA): dcg_ps_la@lenovo.com

- Europe, Middle East, Africa: dcg_ps_emea@lenovo.com

Regulatory compliance

The HX1021 server conforms to the following standards:

- NEBS 3 certification (configurations limitations apply; contact your Lenovo representative for details)
- UL62368-1
- CSA C22.2, No. 62368-1-14
- NOM-019
- IEC 60950-1 (CB Certificate and CB Test Report), IEC 62368-1 (CB Certificate and CB Test Report)
- China CCC (GB4943.1), GB9254 Class A, GB17625.1, CECP, CELP (planned for 12/2019)
- Taiwan BSMI CNS13438, Class A; CNS14336-1
- EAC Russia, Belorussia and Kazakhstan, TR CU 020/2011 and TR CU 004/2011
- CE Mark (EN55032 Class A, EN60950-1, EN55024, EN61000-3-2, and EN61000-3-3, EN 62368-1)
- TUV-GS (EN62368-1, EK1-ITB2000)
- India BIS certification
- USA FCC Title 47 CFR Part 15 Subpart B
- Canada ICES-003, issue 6, Class A
- Australia/New Zealand AS/NZS CISPR 32, Class A
- Japan VCCI 32-1
- Taiwan BSMI CNS13438, Class A; CNS14336-1
- Korea KN32, Class A; KN35
- CE Mark (EN55032 Class A, EN60950-1, EN55024, EN61000-3-2, and EN61000-3-3, EN 62368-1)
- CISPR 32, Class A

Uninterruptible power supply units

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

Table 35. 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 the Asia Pacific market.

For more information, see the list of Product Guides in the UPS category:
https://lenovopress.com/servers/options/ups

Power distribution units

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

Table 36. Power distribution units

Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
0U Basic PDUs															
00YJ776	ATZY	0U 36 C13/6 C19 24A 1 Phase PDU	N	Y	Y	N	N	N	N	N	N	Y	Y	Y	N
0U Switched and Monitored PDUs															
00YJ783	AU04	0U 12 C13/12 C19 Switched and Monitored 48A 3 Phase PDU	N	N	Y	N	N	N	Y	N	N	Y	Y	Y	N
00YJ781	AU03	0U 20 C13/4 C19 Switched and Monitored 24A 1 Phase PDU	N	N	Y	N	Y	N	Y	N	N	Y	Y	Y	N
1U Switched and Monitored PDUs															

Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
4PU7A81117	BNDV	1U 18 C19/C13 switched and monitored 48A 3P WYE PDU - ETL	N	N	N	N	N	N	N	N	N	N	N	Y	N
4PU7A77467	BLC4	1U 18 C19/C13 Switched and Monitored 80A 3P Delta PDU	N	N	N	N	N	N	N	N	N	Y	N	Y	N
4PU7A77469	BLC6	1U 12 C19/C13 switched and monitored 60A 3P Delta PDU	N	N	N	N	N	N	N	N	N	N	N	Y	N
4PU7A77468	BLC5	1U 12 C19/C13 switched and monitored 32A 3P WYE PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	Y	Y
4PU7A81118	BNDW	1U 18 C19/C13 switched and monitored 48A 3P WYE PDU - CE	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y	N	Y
1U Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets)															
71763NU	6051	Ultra Density Enterprise C19/C13 PDU 60A/208V/3PH	N	N	Y	N	N	N	N	N	N	Y	Y	Y	N
71762NX	6091	Ultra Density Enterprise C19/C13 PDU Module	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1U C13 Enterprise PDUs (12x IEC 320 C13 outlets)															
39Y8941	6010	DPI C13 Enterprise PDU Module (WW)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1U Front-end PDUs (3x IEC 320 C19 outlets)															
39Y8938	6002	DPI Single-phase 30A/120V Front-end PDU (US)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
39Y8939	6003	DPI Single-phase 30A/208V Front-end PDU (US)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
39Y8934	6005	DPI Single-phase 32A/230V Front-end PDU (International)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
39Y8940	6004	DPI Single-phase 60A/208V Front-end PDU (US)	Y	N	Y	Y	Y	Y	Y	N	N	Y	Y	Y	N
39Y8935	6006	DPI Single-phase 63A/230V Front-end PDU (International)	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
1U NEMA PDUs (6x NEMA 5-15R outlets)															
39Y8905	5900	DPI 100-127V NEMA PDU	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Line cords for 1U PDUs that ship without a line cord															
40K9611	6504	4.3m, 32A/380-415V, EPDU/IEC 309 3P+N+G 3ph wye (non-US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9612	6502	4.3m, 32A/230V, EPDU to IEC 309 P+N+G (non-US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9613	6503	4.3m, 63A/230V, EPDU to IEC 309 P+N+G (non-US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9614	6500	4.3m, 30A/208V, EPDU to NEMA L6-30P (US) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
40K9615	6501	4.3m, 60A/208V, EPDU to IEC 309 2P+G (US) Line Cord	N	N	Y	N	N	N	Y	N	N	Y	Y	Y	N
40K9617	6505	4.3m, 32A/230V, Souriau UTG Female to AS/NZ 3112 (Aus/NZ) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

Part number	Feature code	Description	ANZ	ASEAN	Brazil	EET	MEA	RUCIS	WE	HTK	INDIA	JAPAN	LA	NA	PRC
40K9618	6506	4.3m, 32A/250V, Souriau UTG Female to KSC 8305 (S. Korea) Line Cord	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

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

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

Rack cabinets

The HX1021 supports installation in a rack when mounted in either the 1U E1 Enclosure or the 2U E2 Enclosure. See Mounting options for details.

Note: The E2 Enclosure is not supported in the 12U and 18U Micro Data Center rack cabinets.

The following table lists the supported rack cabinets.

Table 37. Rack cabinets

Part number	Description
7D3F0001WW / 7D3G0001WW	6U 800mm Deep Micro Datacenter Rack
7D3H0001WW / 7D3J0001WW	6U 1200mm Deep Micro Datacenter Rack
7D2A0001WW / 7D2M0001WW	6U Acoustic 1200mm Deep Micro Datacenter Rack
7D2B0001WW / 7D2N0001WW	12U 1200mm Deep Micro Datacenter Rack
7D2C0001WW / 7D2P0001WW	18U 1200mm Deep Micro Datacenter Rack
93072RX	25U Standard Rack (1000mm)
93072PX	25U Static S2 Standard Rack (1000mm)
7D6DA007WW	ThinkSystem 42U Onyx Primary Heavy Duty Rack Cabinet (1200mm)
7D6DA008WW	ThinkSystem 42U Pearl Primary Heavy Duty Rack Cabinet (1200mm)
1410-O42	Lenovo EveryScale 42U Onyx Heavy Duty Rack Cabinet
1410-P42	Lenovo EveryScale 42U Pearl Heavy Duty Rack Cabinet
93604PX	42U 1200mm Deep Dynamic Rack
93614PX	42U 1200mm Deep Static Rack
93634PX	42U 1100mm Dynamic Rack
93634EX	42U 1100mm Dynamic Expansion Rack
93074RX	42U Standard Rack (1000mm)
7D6EA009WW	ThinkSystem 48U Onyx Primary Heavy Duty Rack Cabinet (1200mm)
7D6EA00AWW	ThinkSystem 48U Pearl Primary Heavy Duty Rack Cabinet (1200mm)
1410-O48	Lenovo EveryScale 48U Onyx Heavy Duty Rack Cabinet
1410-P48	Lenovo EveryScale 48U Pearl Heavy Duty Rack Cabinet

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

Notes: The following racks do not support the use of the cable management arm (CMA):

- 25U racks, type 9307
- 42U racks, type 9307

KVM console options

The following table lists the supported KVM consoles.

Table 38. KVM console

Part number	Description
4XF7A84188	ThinkSystem 18.5" LCD Console (with US English keyboard)

The following table lists the available KVM switches and the options that are supported with them.

Table 40. KVM switches and options

Part number	Description
KVM Console switches	
1754D2X	Global 4x2x32 Console Manager (GCM32)
1754D1X	Global 2x2x16 Console Manager (GCM16)
1754A2X	Local 2x16 Console Manager (LCM16)
1754A1X	Local 1x8 Console Manager (LCM8)
Cables for GCM and LCM Console switches	
46M5383	Virtual Media Conversion Option Gen2 (VCO2)
46M5382	Serial Conversion Option (SCO)

For more information, see the list of Product Guides in the KVM Switches and Consoles category: http://lenovopress.com/servers/options/kvm

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Related publications and links

For more information, see these resources:

- Lenovo ThinkAgile HX Series
  https://www.lenovo.com/us/en/data-center/software-defined-infrastructure/ThinkAgile-HX-Series/p/WMD00000326
- ThinkAgile HX Series Comparison reference
  https://lenovopress.com/lp1336-thinkagile-hx-series-comparison
- Interactive 3D Tour of ThinkAgile HX Series offerings:
  https://lenovopress.com/lp0454-lenovo-thinkagile-hx-series-interactive-3d-tour
- Lenovo Data Center Solution Configurator (DCSC):
  http://dcsc.lenovo.com
- Lenovo ThinkAgile product publications (user manuals):
  https://thinkagile.lenovofiles.com/help/index.jsp
- Nutanix documentation
  https://my.nutanix.com/
- Lenovo ThinkAgile HX Series Best Recipes
  http://datacentersupport.lenovo.com/us/en/solutions/ht505413
- Lenovo Data Center Support
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Related product families

Product families related to this document are the following:

- Edge Computing and Internet of Things (IoT)
- Edge Servers
- Hyperconverged Infrastructure
- Hyperconverged Infrastructure
- ThinkAgile HX Series for Nutanix

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