

Lenovo ThinkAgile HX665 V3 Integrated System and Certified Node, HX665 V3 Storage Integrated System and Certified Node (AMD 9000)

Product Guide

The Lenovo ThinkAgile HX665 V3 Integrated Systems and Certified Nodes are 2-socket 2U systems that features AMD EPYC 9000 Series 5th Generation "Turin" and 4th Generation "Genoa" family of processors and are designed for deploying industry-leading hyperconvergence software from Nutanix on Lenovo enterprise platforms. Nutanix brings the benefits of web-scale technologies to enterprise applications through enterprise storage, data protection, infrastructure resilience, management and analytics, and security. With up to 96 cores per processor and support for the new PCIe 5.0 standard for I/O, the HX665 V3 offer the ultimate in two-socket performance in a 2U form factor.

The 2U systems are available either as an Integrated System (HX665 V3 IS) or Certified Node (HX665 V3 CN):

- HX665 V3 Storage IS and HX665 V3 Storage CN are for storage-heavy workloads
- HX665 V3 IS and HX665 V3 CN are for high performance workloads

The ThinkAgile HX665 V3 Integrated Systems delivers fully validated, certified and integrated Lenovo hardware and firmware preloaded with licensed Nutanix software. It also includes ThinkAgile Premier support with one single point of contact for support of the hardware and software.

The ThinkAgile HX665 V3 Certified Nodes delivers fully validated and certified Lenovo hardware and firmware and can be preloaded with Nutanix software. Certified Nodes do not include licenses to Nutanix software and enhanced software support.



Figure 1. Lenovo ThinkAgile HX665 V3 Integrated Systems and Certified Nodes with 2.5-inch drive bays

Did you know?

The ThinkAgile HX665 V3 Integrated Systems and Certified Nodes are built on the Lenovo ThinkSystem SR665 v3 server that features enterprise-class reliability, management, and security.

The HX665 V3 Integrated Systems offers in supported countries ThinkAgile Premier Single Point of Support for quick 24/7 problem reporting and resolution.

The systems have been designed to take advantage of the features of the 5th Generation AMD AMD EPYC 9005 Series "Turin" and 4th Generation EPYC 9004 Series "Genoa" family of processors and support for the new PCIe 5.0 standard for I/O,

The systems are available as an Integrated System or a Certified Node delivering greater virtualized workload consolidation with higher core count, GPU support and easy-to-use lifecycle management console.

Key features

Combining performance and flexibility, the HX665 V3 are a great choice for enterprises of all sizes. The systems offer a broad selection of processors, memory and drives, and offers high performance features that industries such as finance, healthcare and telco need. Outstanding reliability, availability, and serviceability (RAS) and high-efficiency design can improve your business environment and can help save operational costs.

HX665 V3 Integrated System

The HX665 V3 Integrated systems offer the following key features:

- Factory-integrated, pre-configured ready-to-go integrated systems built on proven and reliable Lenovo ThinkSystem servers that provide compute power for a variety of workloads and applications and powered by industry's most feature-rich hyperconverged infrastructure software from Nutanix.
- Provide quick and convenient path to implement a hyperconverged solution powered by Nutanix with "one stop shop" and a single point of contact provided by Lenovo for purchasing, deploying, and supporting the solution.
- Meet various workload demands with cost-efficient hybrid or performance-optimized all-flash storage configurations.
- Deliver fully validated and integrated hardware and firmware that is certified with Nutanix software.
- Include in supported countries, Lenovo ThinkAgile Premier Single Point of Support for quick 24/7 problem reporting and resolution.
- Offer Lenovo deployment services to get customers up and running quickly.

HX665 V3 Certified Node

The HX665 V3 Certified Nodes offer the following key features:

- Built on proven and reliable Lenovo ThinkSystem servers that provide compute power for a variety of workloads and applications.
- 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 (Note: 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 HX665 V3 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.

Hardware features

The HX systems are based on the SR665 V3 and have the following hardware features:

Scalability and performance

The HX665 V3 offer numerous features to boost performance, improve scalability and reduce costs:

- Supports one or two fifth-generation AMD EPYC 9005 processors.
 - Up to 128 cores and 256 threads
 - Core speed of up to 4.0 GHz
 - TDP rating of up to 400 W
- Supports one or two fourth-generation AMD EPYC 9004 processors
 - Up to 96 cores and 192 threads
 - Core speed of up to 3.6 GHz
 - TDP rating of up to 360 W
- Support for DDR5 memory DIMMs to maximize the performance of the memory subsystem:
 - Up to 24 DDR5 memory DIMMs, 12 DIMMs per processor
 - 12 memory channels per processor (1 DIMM per channel)
 - DIMM speeds up to 4800 MHz
 - Using 256GB 3DS RDIMMs, the server supports up to 6TB of system memory
- Supports up to 24x 2.5-inch hot-swap drive bays.
- Supports 16x NVMe drives without oversubscription of PCIe lanes (1:1 connectivity). The use of NVMe drives maximizes drive I/O performance, in terms of throughput, bandwidth, and latency
- Supports M.2 drives for convenient operating system boot functions or data storage. Available M.2 adapters support two M.2 drives with a RAID adapter installed in a slot.
- The systems have a dedicated industry standard OCP 3.0 small form factor (SFF) slot, with a PCIe 5.0 x16 interface, supporting a variety of Ethernet network adapters. Simple-swap mechanism with thumbscrews and pull-tab enables tool-less installation and removal of the adapter. Supports shared BMC network sideband connectivity to enable out-of-band systems management.
- The server offers PCI Express 5.0 (PCIe Gen 5) I/O expansion capabilities that doubles the theoretical maximum bandwidth of PCIe 4.0 (32GT/s in each direction for PCIe 5.0, compared to 16 GT/s with PCIe 4.0). A PCIe 5.0 x16 slot provides 128 GB/s bandwidth, enough to support a 400GbE network connection.
- Up to ten PCIe 5.0 slots, all with rear access, plus an internal bay for a cabled RAID adapter or HBA, plus a slot dedicated to the OCP adapter.

Availability and serviceability

The HX665 V3 provide many features to simplify serviceability and increase system uptime:

- The HX665 V3 uses ECC memory and supports memory RAS features including Single Device Data Correction (SDDC, also known as Chipkill), Patrol/Demand Scrubbing, Bounded Fault, DRAM Address Command Parity with Replay, DRAM Uncorrected ECC Error Retry, On-die ECC, ECC Error Check and Scrub (ECS), and Post Package Repair.
- The server has up to two hot-swap redundant power supplies and up to six hot-swap redundant fans to provide availability for business-critical applications.
- The power-source-independent light path diagnostics uses LEDs to lead the technician to failed (or failing) components, which simplifies servicing, speeds up problem resolution, and helps improve system availability.
- Solid-state drives (SSDs) offer more reliability and performance than traditional mechanical HDDs for greater uptime.
- Proactive Platform Alerts (including PFA and SMART alerts): Processors, voltage regulators, memory, internal storage (SAS/SATA HDDs and SSDs, NVMe SSDs, M.2 storage, flash storage adapters), fans, power supplies, server ambient and subcomponent temperatures. Alerts can be surfaced through the XClarity Controller to managers such as Lenovo XClarity Administrator, VMware vCenter, and Nutanix ?. These proactive alerts let you take appropriate actions in advance of possible failure, thereby increasing server uptime and application availability.
- The built-in XClarity Controller 2 continuously monitors system parameters, triggers alerts, and performs recovery actions in case of failures to minimize downtime.
- Built-in diagnostics in UEFI, using Lenovo XClarity Provisioning Manager, speed up troubleshooting tasks to reduce service time.
- Lenovo XClarity Provisioning Manager supports diagnostics and can save service data to a USB key drive or remote CIFS share folder for troubleshooting and reduce service time.
- Auto restart in the event of a momentary loss of AC power (based on power policy setting in the XClarity Controller service processor)
- Offers a diagnostics port on the front of the server to allow you to attach an external diagnostics handset for enhanced systems management capabilities.
- Support for the XClarity Administrator Mobile app running on a supported smartphone or tablet and connected to the server through the service-enabled USB port, enables additional local systems management functions.
- Three-year or one-year customer-replaceable unit and onsite limited warranty (varies by geography), 9 x 5 next business day. Optional service upgrades are available.

Manageability and security

Systems management features simplify local and remote management of the HX665 V3:

- The server includes an XClarity Controller 2 (XCC2) to monitor server availability. Includes upgrade to XCC Platinum to provide remote control (keyboard video mouse) functions, support for the mounting of remote media files, FIPS 140-3 security, enhanced NIST 800-193 support, boot capture, power capping, and other management and security features.
- Lenovo XClarity Administrator offers comprehensive hardware management tools that help to increase uptime, reduce costs and improve productivity through advanced server management capabilities.
- UEFI-based Lenovo XClarity Provisioning Manager, accessible from F1 during boot, provides system inventory information, graphical UEFI Setup, platform update function, operating system installation function, and diagnostic functions.
- Support for Lenovo XClarity Energy Manager, which captures real-time power and temperature data from the server and provides automated controls to lower energy costs.
- An integrated industry-standard Unified Extensible Firmware Interface (UEFI) enables improved setup,

configuration, and updates, and simplifies error handling.

- Support for industry standard management protocols, IPMI 2.0, SNMP 3.0, Redfish REST API, serial console via IPMI
- An integrated hardware Trusted Platform Module (TPM) supporting TPM 2.0 enables advanced cryptographic functionality, such as digital signatures and remote attestation.
- Administrator and power-on passwords help protect from unauthorized access to the server.
- Supports Secure Boot to ensure only a digitally signed operating system can be used. Supported with HDDs and SSDs, as well as M.2 drives.
- Industry-standard Advanced Encryption Standard (AES) NI support for faster, stronger encryption.
- Supports AMD Secure Root-of-Trust, Secure Run and Secure Move features to minimize potential attacks and protect data as the OS is booted, as applications are run and as applications are migrated from server to server.
- Additional physical security features are an available chassis intrusion switch and available lockable front bezel.

Energy efficiency

The HX665 V3 offer the following energy-efficiency features to save energy, reduce operational costs, and increase energy availability:

- Energy-efficient planar components help lower operational costs.
- High-efficiency power supplies with 80 PLUS Platinum and Titanium certifications
- Solid-state drives (SSDs) consume as much as 80% less power than traditional spinning 2.5-inch HDDs.
- The server uses hexagonal ventilation holes, which can be grouped more densely than round holes, providing more efficient airflow through the system and thus keeping your system cooler.
- Optional Lenovo XClarity Energy Manager provides advanced data center power notification, analysis, and policy-based management to help achieve lower heat output and reduced cooling needs.

Components and connectors

The ThinkAgile HX665 V3 Integrated Systems and Certified Nodes are based on the ThinkSystem SR665 V3 server.

The following figure shows the front of the HX665 V3 with 2.5-inch drives.

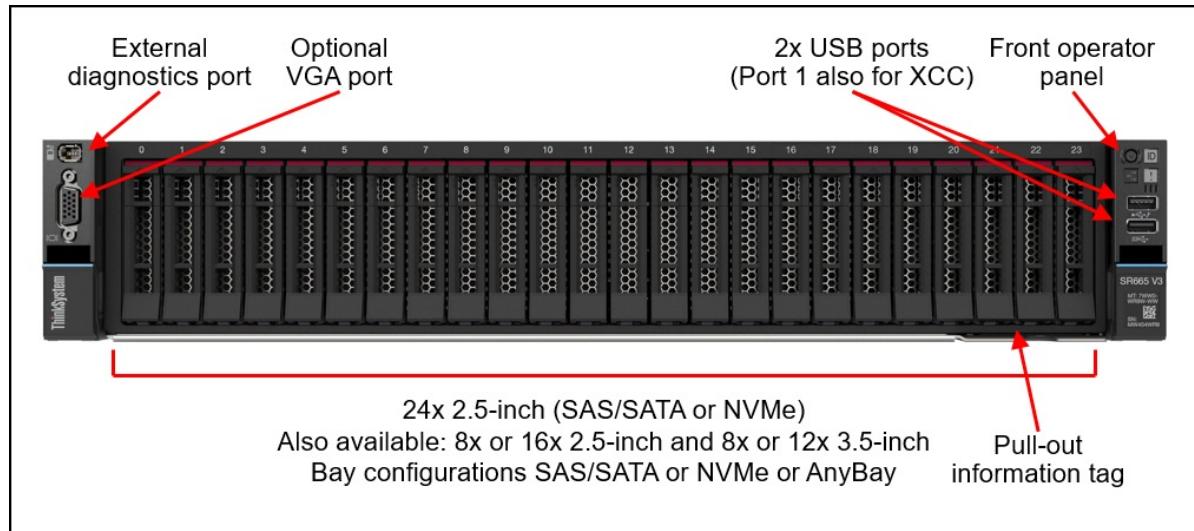


Figure 2. Front view with 2.5-inch drives

The following figure shows the front of the HX665 V3 with 3.5-inch drives.

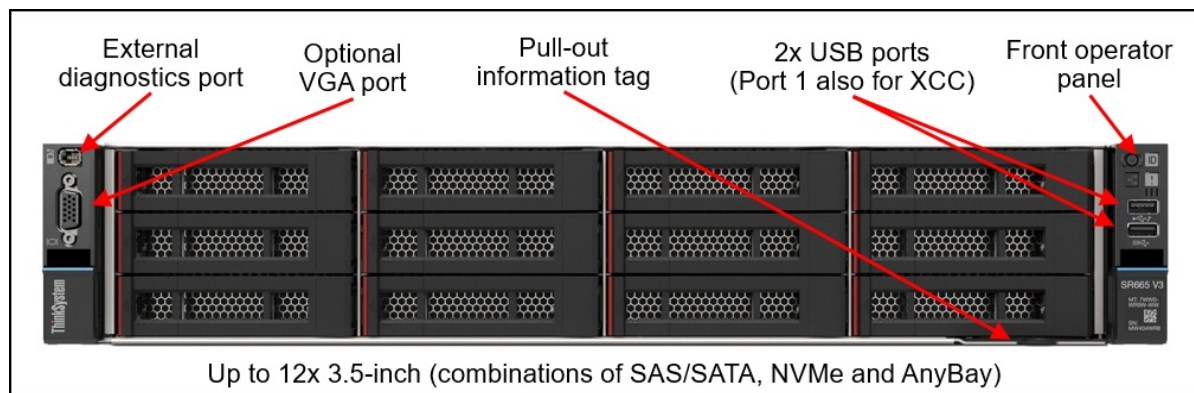


Figure 3. Front view with 3.5-inch drives

The following figure shows the components visible from the rear of the server. The figure shows one configuration, with eight full-height PCIe slots, however there are additional rear configurations which include 10 PCIe slots (6x full-height, 4x low-profile), or include 3.5-inch drive bays or 2.5-inch drive bays.

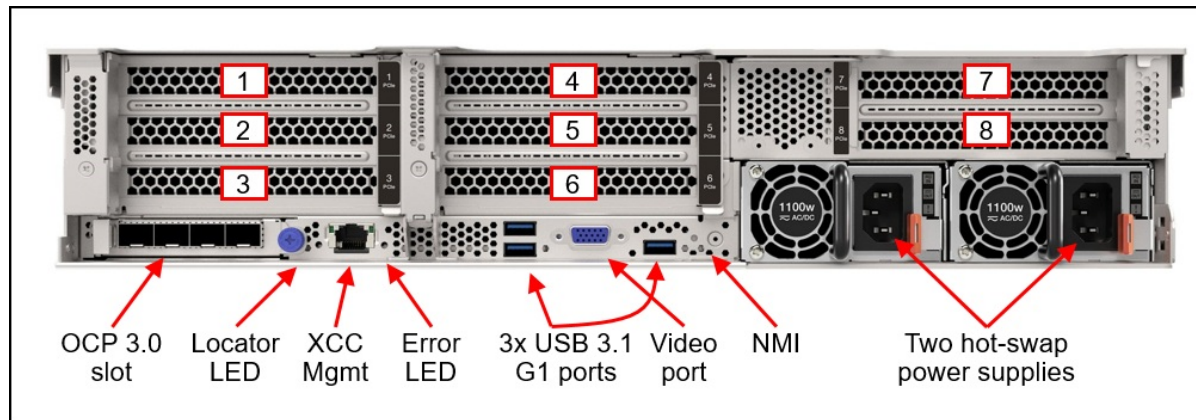


Figure 4. Rear view of the HX665 V3 systems (configuration with eight PCIe slots)

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

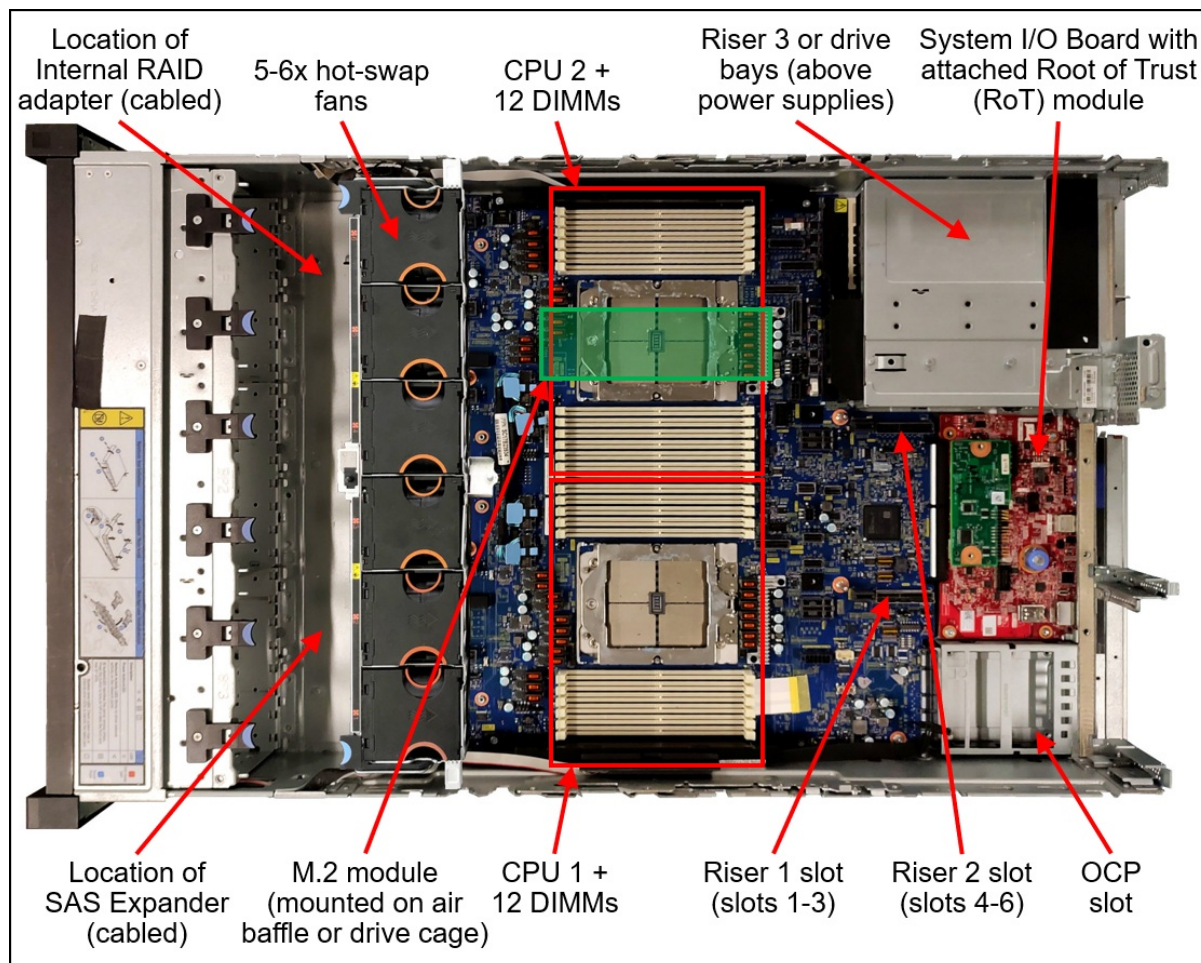


Figure 5. Internal view of the HX665 V3 systems

Standard specifications

The ThinkAgile HX665 V3 Integrated Systems and Certified Nodes are based on the ThinkSystem SR665 V3 server.

The following table provides an overview comparison between the HX665 V3 systems.

Table 1. Comparison of features

	HX665 V3 IS HX665 V3 CN	HX665 V3 IS Storage HX665 V3 CN Storage
HX offering type	Integrated System Certified Node	Integrated System Certified Node
Target workloads	High Performance	Storage heavy
Base MTM	IS: 7D9NCTO1WW CN: 7D9NCTO3WW	IS: 7D9NCTO2WW CN: 7D9NCTO4WW
Form Factor	2U	2U
Base platform	SR665 V3	SR665 V3
Supported cluster sizes	1 or 3+ Nodes	1 or 3+ Nodes
CPU	2x EPYC 9005 (Turin) 2x EPYC 9004 (Genoa)	1x or 2x EPYC 9005 (Turin) 1x or 2x EPYC 9004 (Genoa)
Memory	24x DDR5 4800MHz (6TB maximum)	24x DDR5 4800MHz (6TB maximum)
Drive Bays	24x 2.5-inch SAS/SATA 16x 3.5-inch SAS/SATA 20x 2.5-inch NVMe	12x 3.5-inch SAS/SATA 4x 2.5-inch SAS/SATA
Drive configurations	All Flash Hybrid	All Flash Hybrid
HBA	8/i16i 8i/16i	16i
Boot drives	2x M.2 NVME	2x M.2 NVME
OCF networking	1x OCP 3.0 adapter 10Gb, 25Gb	1x OCP 3.0 adapter 10Gb, 25Gb
PCIe networking	Up to 8x PCIe adapters 10Gb, 25Gb	Up to 5x PCIe adapters 10Gb, 25Gb
GPUs	3x Double Wide GPU 8x Single Wide GPU	3x Double Wide GPU 8x Single Wide GPU
Hypervisor	Nutanix AHV, VMware ESXi	Nutanix AHV, VMware ESXi

The following table lists the standard specifications.

Table 2. Standard specifications

Components	Specification
Machine types	7D9N - 3 year warranty
Form factor	2U rack

Components	Specification
Processor	<p>One or two AMD EPYC 9005 Series processors (codenamed "Turin"). Supports processors up to 128 cores, core speeds of up to 4.0 GHz, and TDP ratings of up to 400W. Supports PCIe 5.0 for high performance I/O.</p> <p>One or two AMD EPYC 9004 Series processors (codenamed "Genoa"). Supports processors up to 96 cores, core speeds of up to 3.6 GHz, and TDP ratings of up to 360W. Supports PCIe 5.0 for high performance I/O.</p>
Chipset	Not applicable (platform controller hub functions are integrated into the processor)
Memory	24 DIMM slots with two processors (12 DIMM slots per processor). Each processor has 12 memory channels, with 1 DIMM per channel (DPC). Lenovo TruDDR5 RDIMMs, 3DS RDIMMs, and 9x4 RDIMMs are supported, up to 4800 MHz
Memory maximum	Up to 6TB with 24x 256GB 3DS RDIMMs
Memory protection	ECC, SDDC, Patrol/Demand Scrubbing, Bounded Fault, DRAM Address Command Parity with Replay, DRAM Uncorrected ECC Error Retry, On-die ECC, ECC Error Check and Scrub (ECS), Post Package Repair
Disk drive bays	<ul style="list-style-type: none"> ● HX665 V3 - Integrated System and Certified Node: <ul style="list-style-type: none"> ○ Front drive bays: 24 x2.5" SATA/SAS, 20x 2.5" NVMe ○ Rear Drive Bays: None ● HX665 V3 Storage - Integrated System and Certified Node: <ul style="list-style-type: none"> ○ Front drive bays: 12x3.5" SATA/SAS ○ Rear drive bays: 4x2.5" SATA/SAS (optional) ● Internal M.2 module supporting up to two M.2 drives, for OS boot support
Storage controller	440- 8i/16i SAS HBA
Network interfaces	Dedicated OCP 3.0 SFF slot with PCIe 5.0 x16 host interface at the rear of the server (rear-accessible). Supports a variety of 2-port and 4-port adapters with 10GbE and 25GbE network connectivity. One port can optionally be shared with the XClarity Controller 2 (XCC2) management processor for Wake-on-LAN and NC-SI support. Additional PCIe network adapters supported in PCIe slots.
PCIe slots	<p>Up to 10x PCIe slots with rear access, plus a slot dedicated to the OCP adapter. Slot are either PCIe 5.0 or 4.0 depending on riser selection and rear drive bay selection. The use of slots X-10 require two processors.</p> <p>Slots are configured using three riser cards. Riser 1 (slots 1-3) and Riser 2 (slots 4-6) are installed in slots in the system board, Riser 3 (slots 7-8) is cabled to ports on the system board.</p> <p>A variety of riser cards are available.</p> <p>For 2.5-inch front drive configurations, the server supports the installation of a RAID adapter or HBA in a dedicated area that does not consume any of the PCIe slots.</p> <p>The server alternatively supports slots at the front of the server (configurations with up to 16 drive bays)</p> <ul style="list-style-type: none"> ● 1x OCP slot ● 2x PCIe x16 full-height half-length slots
GPU support	Wave 2 Support

Components	Specification
Ports	<p>Front: 1x USB 3 G1 (5 Gb/s) port, 1x USB 2.0 port (also for XCC local management), External diagnostics port, optional VGA port.</p> <p>Rear: 3x USB 3 G1 (5 Gb/s) ports, 1x VGA video port, 1x RJ-45 1GbE systems management port for XCC remote management. Optional 2nd XCC remote management port (installs in OCP slot). Optional DB-9 COM serial port (installs in slot 3).</p> <p>Internal: 1x USB 3 G1 (5 Gb/s) connector for operating system or license key purposes.</p>
Cooling	Up to 6x N+1 redundant hot swap 60 mm fans, configuration dependent. One fan integrated in each power supply.
Power supply	Up to two hot-swap redundant AC power supplies, 80 PLUS Platinum or 80 PLUS Titanium certification. 750 W, 1100 W, 1800 W, and 2400 W, supporting 220 V AC. 750 W and 1100 W options also support 110V input supply. In China only, all power supply options support 240 V DC. Also available is a 1100W power supply with a -48V DC input.
Video	Embedded video graphics with 16 MB memory with 2D hardware accelerator, integrated into the XClarity Controller. Maximum resolution is 1920x1200 32bpp at 60Hz.
Hot-swap parts	Drives, power supplies, and fans.
Systems management	Operator panel with status LEDs. Optional External Diagnostics Handset with LCD display. Models with 16x 2.5-inch front drive bays can optionally support an Integrated Diagnostics Panel. XClarity Controller 2 (XCC2) embedded management based on the ASPEED AST2600 baseboard management controller (BMC). Dedicated rear Ethernet port for XCC2 remote access for management. Optional 2nd redundant XCC2 remote port supported, installs in the OCP slot. XClarity Administrator for centralized infrastructure management, XClarity Integrator plugins, and XClarity Energy Manager centralized server power management. Included XCC Platinum enables remote control functions and other features.
Security features	Chassis intrusion switch, Power-on password, administrator's password, Root of Trust module supporting TPM 2.0 and Platform Firmware Resiliency (PFR). Optional lockable front security bezel.
Software	<ul style="list-style-type: none"> Integrated Systems: Nutanix Acropolis: Starter, Pro, and Ultimate editions. Nutanix Prism, Nutanix Calm (optional), Nutanix Flow (optional). Certified Nodes: Nutanix Acropolis Starter, Pro and Ultimate editions (licenses purchased separately from Nutanix or a Nutanix reseller).
Hypervisors	Nutanix AHV or VMware ESXi.
Hardware warranty	<ul style="list-style-type: none"> Integrated Systems: Three-, four-, or five-year customer-replaceable unit and onsite limited hardware warranty with ThinkAgile Premier 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. Certified Nodes: 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.
Software maintenance	Three-, four-, or five-year software support and subscription (matches the duration of the selected warranty period).
Dimensions	Width: 445 mm (17.5 in.), height: 87 mm (3.4 in.), depth: 766 mm (30.1 in.)
Weight	Maximum: 38.8 kg (85.5 lb)

Models

Factory-integrated models of the integrated systems and certified nodes are configured by using the Lenovo Data Center Solution Configurator (DCSC), <http://dcsc.lenovo.com>

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

To ensure that the controlled GPUs and accelerators are only sold in the supported markets, the following configure-to-order base machine-type models (CTO MTMs) are selectable in DCSC:

- **Standard Open models** are available in all markets worldwide. Controlled GPUs cannot be configured using these models. These are CTO1WW models.
- **GPU Controlled models** are used to order any of the controlled GPUs and accelerators. Controlled models are not available in affected markets. If you start from a controlled model, your configuration must include a controlled GPUs.

Note:

- For all models listed in the GPU **Controlled models** column, one of the controlled GPUs *must* be selected in the DCSC configurator. DCSC will display an error if you configuration does not include one of the controlled GPUs.
- You are required to engage a Lenovo representative in the project that includes the ThinkAgile HX Series Integrated Systems. ThinkAgile HX Certified Nodes do not have this requirement.

The following table lists the base CTO models.

Table 3. CTO base models

Server model	Standard Open models	GPU Controlled models
	These CTO models are available in all markets. Configurations based on these MTMs cannot include controlled GPUs.	These CTO models are not available in affected markets. Configurations based on these MTMs must include controlled GPUs.
ThinkAgile HX665 V3 Integrated System	7D9NCTO1WW	7D9NCTOAWW
ThinkAgile HX665 V3 Storage Integrated System	7D9NCTO2WW	None
ThinkAgile HX665 V3 Certified Node	7D9NCTO3WW	7D9NCTOCWW
ThinkAgile HX665 V3 Storage Certified Node	7D9NCTO4WW	None
ThinkAgile HX665 V3 LOD Integrated System - China Only	7D9NCTO5WW	None
ThinkAgile HX665 V3 Storage LOD Integrated System - China Only	7D9NCTO6WW	None

Comparison with the ThinkSystem SR665 V3

The ThinkAgile HX665 V3 Integrated Systems and Certified Nodes are based on the ThinkSystem SR665 V3 server, however there are key differences:

- No onboard SATA controller support
- No RAID adapter support
- No SATA HDDs
- No support for SED drives
- Fibre Channel support for data migration only
- InfiniBand support only supports the ethernet function
- Drives are categorized as Cache or Capacity drives and are formed as disk groups (up to 5 disk groups)

For details about the ThinkSystem SR665 V3, see the SR665 V3 product guide:

<https://lenovopress.com/lp1608-thinksystem-sr665-v3-server>

To verify what specific hardware components are supported with the HX665 V3, see the DCSC configurator:

<https://dcsc.lenovo.com>

Processors

The HX665 V3 supports processors in either the 5th Gen Intel AMD EPYC Processor family or the 4th Gen AMD EPYC Processor family.

Topics in this section:

- [5th Gen AMD EPYC processors](#)
- [4th Gen AMD EPYC processors](#)
- [Lenovo Processor Neptune Core Module - Open-loop liquid cooling](#)

5th Gen AMD EPYC processors

The HX665 V3 systems support the following fifth -generation AMD EPYC processors. The systems supports 2 processors installed.

For details about the ThinkSystem SR665 V3, see the SR665 V3 product guide:

<https://lenovopress.com/lp1608-thinksystem-sr665-v3-server#processor-options>

Configuration notes:

- HX665 V3 Integrated Systems and Certified Nodes supports 2 processors
- HX665 V3 Storage - Integrated Systems and Certified Node supports 1 or 2 processors

Table 4. Turin Processors

Part number	Feature	Description	Maximum supported			
			HX665 V3 IS	HX665 V3 CN	HX665 V3 Storage IS	HX665 V3 Storage CN
None	C2AF	ThinkSystem AMD EPYC 9015 8C 125W 3.6GHz Processor	2	2	2	2
None	C2AG	ThinkSystem AMD EPYC 9115 16C 125W 2.6GHz Processor	2	2	2	2
None	C2AK	ThinkSystem AMD EPYC 9135 16C 200W 3.65GHz Processor	2	2	2	2
None	C2AR	ThinkSystem AMD EPYC 9175F 16C 320W 4.2GHz Processor	2	2	2	2
None	C2AP	ThinkSystem AMD EPYC 9255 24C 200W 3.25GHz Processor	2	2	2	2
None	C2AT	ThinkSystem AMD EPYC 9275F 24C 320W 4.1GHz Processor	2	2	2	2
None	C2AQ	ThinkSystem AMD EPYC 9335 32C 210W 3.0GHz Processor	2	2	2	2
None	C2AZ	ThinkSystem AMD EPYC 9355 32C 280W 3.55GHz Processor	2	2	2	2
None	C2AV	ThinkSystem AMD EPYC 9355P 32C 280W 3.55GHz Processor	1	1	1	1
None	C2AM	ThinkSystem AMD EPYC 9365 36C 300W 3.4GHz Processor	2	2	2	2
None	C2AJ	ThinkSystem AMD EPYC 9375F 32C 320W 3.8GHz Processor	2	2	2	2
None	C2ND	ThinkSystem AMD EPYC 9455 48C 300W 3.15GHz Processor	2	2	2	2
None	C2NE	ThinkSystem AMD EPYC 9455P 48C 300W 3.15GHz Processor	1	1	1	1
None	C2A3	ThinkSystem AMD EPYC 9475F 48C 400W 3.65GHz Processor	2	2	2	2
None	C2AL	ThinkSystem AMD EPYC 9535 64C 300W 2.4GHz Processor	2	2	2	2
None	C2AY	ThinkSystem AMD EPYC 9555 64C 360W 3.2GHz Processor	2	2	2	2
None	C2AW	ThinkSystem AMD EPYC 9555P 64C 360W 3.2GHz Processor	1	1	1	1
None	C2AS	ThinkSystem AMD EPYC 9565 72C 400W 3.15GHz Processor	2	2	2	2
None	C4H8	ThinkSystem AMD EPYC 9575F 64C 400W 3.3GHz Processor	2	2	2	2
None	C2AN	ThinkSystem AMD EPYC 9645 96C 320W 2.3GHz Processor	2	2	2	2
None	C2AU	ThinkSystem AMD EPYC 9655 96C 400W 2.6GHz Processor	2	2	2	2
None	C2AX	ThinkSystem AMD EPYC 9655P 96C 400W 2.6GHz Processor	1	1	1	1
None	C2AE	ThinkSystem AMD EPYC 9745 128C 400W 2.4GHz Processor	2	2	2	2

4th Gen AMD EPYC processors

The HX665 V3 systems support the following fourth -generation AMD EPYC processors. The systems supports 2 processors installed.

For details about the ThinkSystem SR665 V3, see the SR665 V3 product guide:
<https://lenovopress.com/lp1608-thinksystem-sr665-v3-server#processor-options>

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.

Configuration notes:

- HX665 V3 Integrated Systems and Certified Nodes supports 2 processors
- HX665 V3 Storage - Integrated Systems and Certified Node supports 1 or 2 processors

Table 5. Genoa Processor choices

Part number	Feature	Description	Maximum supported			
			HX665 V3 IS	HX665 V3 CN	HX665 V3 Storage IS	HX665 V3 Storage CN
None	BREE	ThinkSystem AMD EPYC 9124 16C 200W 3.0GHz Processor	2	2	2	2
None	BREJ	ThinkSystem AMD EPYC 9174F 16C 320W 4.1GHz Processor	2	2	2	2
None	BREH	ThinkSystem AMD EPYC 9224 24C 200W 2.5GHz Processor	2	2	2	2
None	BRED	ThinkSystem AMD EPYC 9254 24C 200W 2.9GHz Processor	2	2	2	2
None	BREF	ThinkSystem AMD EPYC 9274F 24C 320W 4.05GHz Processor	2	2	2	2
None	BREC	ThinkSystem AMD EPYC 9334 32C 210W 2.7GHz Processor	2	2	2	2
None	BR30	ThinkSystem AMD EPYC 9354 32C 280W 3.25GHz Processor	2	2	2	2
None	BREG	ThinkSystem AMD EPYC 9354P 32C 280W 3.25GHz Processor	No	No	1	1
None	BR32	ThinkSystem AMD EPYC 9374F 32C 320W 3.85GHz Processor	2	2	2	2
None	BREB	ThinkSystem AMD EPYC 9454 48C 290W 2.75GHz Processor	2	2	2	2
None	BREM	ThinkSystem AMD EPYC 9454P 48C 290W 2.75GHz Processor	No	No	1	1
None	BR31	ThinkSystem AMD EPYC 9474F 48C 360W 3.6GHz Processor	2	2	2	2
None	BREA	ThinkSystem AMD EPYC 9534 64C 280W 2.45GHz Processor	2	2	2	2
None	BPVJ	ThinkSystem AMD EPYC 9554 64C 360W 3.1GHz Processor	2	2	2	2
None	BREL	ThinkSystem AMD EPYC 9554P 64C 360W 3.1GHz Processor	No	No	1	1
None	BR2Z	ThinkSystem AMD EPYC 9634 84C 290W 2.25GHz Processor	2	2	2	2
None	BPVK	ThinkSystem AMD EPYC 9654 96C 360W 2.4GHz Processor	2	2	2	2
None	BREK	ThinkSystem AMD EPYC 9654P 96C 360W 2.4GHz Processor	No	No	1	1

Lenovo Processor Neptune Core Module - Open-loop liquid cooling

The HX665 V3 also supports advanced direct-water cooling (DWC) capability with the Lenovo Processor Neptune Core Module. This module implements a liquid cooling solution where heat from the processors is removed from the rack and the data center using an open loop and coolant distribution units.

With the Processor Neptune Core Module, all heat generated by the processors is removed from the server using water. This means that the server fans and data center air conditioning units only need to remove the heat generated by the other components. This results in lower air conditioning costs and it enables the use of slower fans which results in lower overall power consumption.

The following figure shows the Lenovo Processor Neptune Core Module.

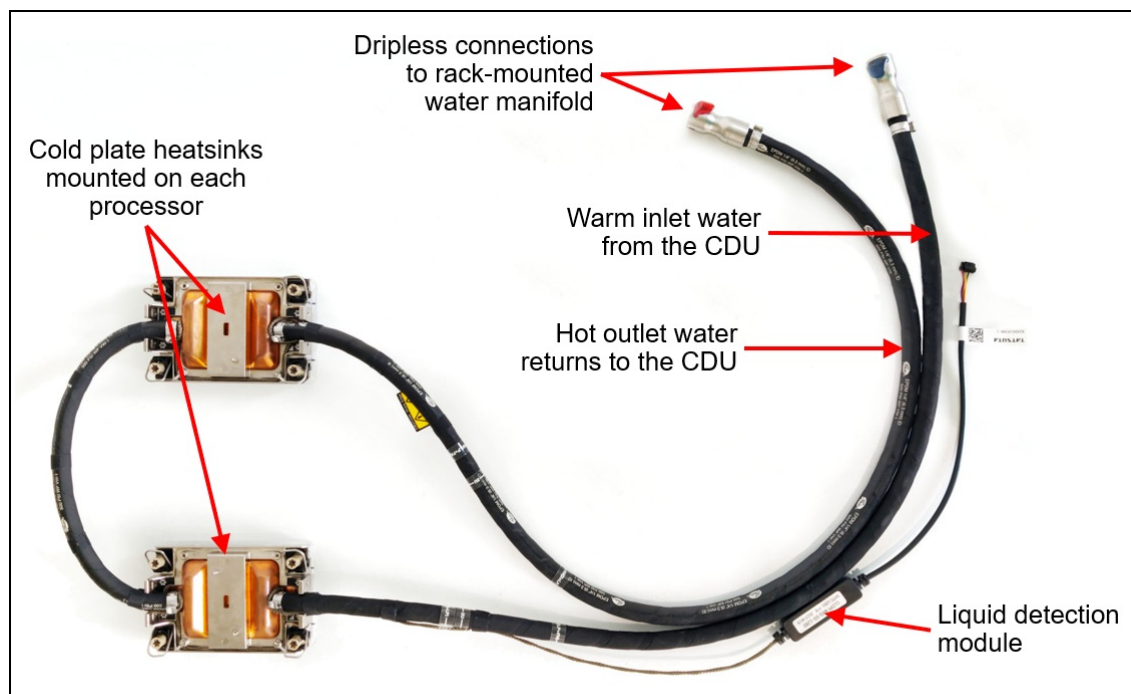


Figure 6. Lenovo Processor Neptune Core Module

The Processor Neptune Core Module also includes a leak detection module which can detect a leakage of more than 0.5ml (about 10 drops) along the length of the tube and then issue an event to the XClarity Controller. XCC will then post an error to the System Event Log and enable further actions. Once the liquid evaporates, a further event is issued to XCC.

The Processor Neptune Core Module is only available in CTO orders, not as a field upgrade. Ordering information is listed in the following table.

Table 6. Lenovo Processor Neptune Core Module

Part number	Feature code	Description
CTO only	BZGM*	ThinkSystem V3 Neptune Processor Direct Water Cooling Solution

* In DCSC, this feature code is listed in the Processor tab

Configuration notes:

- The Processor Neptune Core Module requires water infrastructure be available in the rack cabinet and data center, as described in the [Water infrastructure](#) section.
- All processor SKUs are supported
- Two CPUs are required; Configurations with one processor are not supported

- All front drive bay configurations are supported
- Slot 6 is not available for adapters - the water loop is routed through the space otherwise occupied by slot 6
- Rear drive bays are supported
- 7mm drive bays are supported only in slot 3
- M.2 adapters are supported based on the configurations in the [Storage configurations](#) section
- Standard fans can be configured in most configurations
- The use of a cable management arm (CMA) is not supported

For more information, see the Thermal Rules page:
https://pubs.lenovo.com/sr665-v3/thermal_rules

Memory

The HX665 V3 support the following memory options.

For details about these options, including configuration rules, see the SR665 V3 product guide:
<https://lenovopress.com/lp1608-thinksystem-sr665-v3-server#memory-options>

Table 7. Memory options

Part number	Feature	Description	Maximum supported			
			HX665 V3 IS	HX665 V3 CN	HX665 V3 Storage IS	HX665 V3 Storage CN
4X77A81437	BQ3C	ThinkSystem 16GB TruDDR5 4800MHz (1Rx8) RDIMM-A	24	24	24	24
4X77A81438	BQ39	ThinkSystem 32GB TruDDR5 4800MHz (1Rx4) 10x4 RDIMM-A	24	24	24	24
4X77A81439	BQ3E	ThinkSystem 32GB TruDDR5 4800MHz (1Rx4) 9x4 RDIMM-A	24	24	24	24
4X77A81440	BQ37	ThinkSystem 32GB TruDDR5 4800MHz (2Rx8) RDIMM-A	24	24	24	24
4X77A81441	BQ3D	ThinkSystem 64GB TruDDR5 4800MHz (2Rx4) 10x4 RDIMM-A	24	24	24	24
4X77A81442	BQ36	ThinkSystem 64GB TruDDR5 4800MHz (2Rx4) 9x4 RDIMM-A	24	24	24	24
4X77A81448	BUVV	ThinkSystem 96GB TruDDR5 4800MHz (2Rx4) 10x4 RDIMM-A	24	24	24	24
4X77A81443	BQ3A	ThinkSystem 128GB TruDDR5 4800MHz (4Rx4) 3DS RDIMM-A v2	24	24	24	24
4X77A81444	BQ3B	ThinkSystem 256GB TruDDR5 4800MHz (8Rx4) 3DS RDIMM-A v2	24	24	24	24

Internal storage

Internal storage configurations of the HX665 V3 are as follows. All drives are hot-swap and are accessible from the front or rear of the system:

- HX665 V3 IS and CN:
 - Front drive bays:
 - 24x 2.5-inch SAS/SATA
 - 8x 2.5-inch NVME
 - Rear drive bays:
 - None
- HX665 V3 Storage IS and CN:
 - Front drive bays: 12x 3.5-inch SAS/SATA
 - Rear drive bays: 4x 2.5-inch SAS/SATA (Optional)

The systems also support the following boot drive alternatives:

- The server also supports one or two M.2 drives, installed in an M.2 adapter internal to the server.

Note: Mid-chassis drives are not supported in HX665 V3.

Configuration rules

Configuration rules are as follows:

- For hybrid configurations, the system supports from 4 to 12 capacity drives (HDDs) depending on the quantity of the cache drives (SSDs):
 - For HX665 V3 Storage systems only: 2 cache drives: From 4 to 12 capacity drives in increments of 2 drives
 - For all systems: 4 cache drives: From 8 to 10 capacity drives in increments of 2 drives
- For Hybrid configurations, SATA and SAS SSDs are supported for cache, however NVMe drives are not supported for cache.
- For All Flash configurations, the system supports from 4 to 16 SSDs in increments of 2 drives. If only two SSDs are used, a drive size greater than 1.92TB is required.
- All SSDs in the system must be of the same model and capacity. All HDDs in the system must be of the same type and capacity

Backplanes

The choice of backplanes supported varies by system, as listed in the following table.

For details about these options, including configuration rules, see the SR665 V3 product guide:

<https://lenovopress.com/lp1608-thinksystem-sr665-v3-server#internal-storage>

Table 8. Drive backplanes

Part number	Feature	Description	Maximum supported			
			HX665 V3 IS	HX665 V3 CN	HX665 V3 Storage IS	HX665 V3 Storage CN
Front 3.5-inch drive backplanes						
None	B8LT	ThinkSystem 2U 12x3.5" SAS/SATA Backplane	No	No	1	1
Front 2.5-inch drive backplanes						
None	B8LU	ThinkSystem 2U 8x2.5" SAS/SATA Backplane	2	2	No	No
None	BH8B	ThinkSystem 2U/4U 8x2.5" AnyBay Backplane	1	1	No	No
None	BH8D	ThinkSystem 2U/4U 8x2.5" NVMe Backplane	2	2	No	No
Rear 2.5-inch drive backplanes						
None	B8LV	ThinkSystem 2U 4x2.5" SAS/SATA Backplane	No	No	1	1

Boot drive enablement

For OS boot functions, the systems also supports two M.2 drives installed on an adapter internal to the server. The following table lists the supported controllers/enablement kits for M.2 boot drives.

For details about these options, including configuration rules, see the SR665 V3 product guide:

<https://lenovopress.com/ip1608-thinksystem-sr665-v3-server#internal-storage>

Table 9. Boot drive enablement

Part number	Feature	Description	Maximum supported			
			HX665 V3 IS	HX665 V3 CN	HX665 V3 Storage IS	HX665 V3 Storage CN
4Y37A09750	B8P9	ThinkSystem M.2 NVMe 2-Bay RAID Enablement Kit	1	1	1	1

Controllers for internal storage

The HX665 V3 support the following internal storage controllers.

For details about these options, including configuration rules, see the SR665 V3 product guide:
<https://lenovopress.com/lp1608-thinksystem-sr665-v3-server#controllers-for-internal-storage>

Table 10. Controllers for internal storage

Part number	Feature	Description	Maximum supported			
			HX665 V3 IS	HX665 V3 CN	HX665 V3 Storage IS	HX665 V3 Storage CN
4Y37A78602	BM50	ThinkSystem 440-16i SAS/SATA PCIe Gen4 12Gb HBA	1	1	1	1

Internal drive options

The following table lists the supported drive options for the HX665 V3.

Table 11. Internal drive options

Part number	Feature	Description	Maximum supported			
			HX665 V3 IS	HX665 V3 Storage IS	HX665 V3 CN	HX665 V3 Storage CN
2.5-inch hot-swap 24Gb SAS SSDs						
4XB7A80340	BNW8	ThinkSystem 2.5" PM1655 800GB Mixed Use SAS 24Gb HS SSD	24	4	24	4
4XB7A80341	BNW9	ThinkSystem 2.5" PM1655 1.6TB Mixed Use SAS 24Gb HS SSD	24	4	24	4
4XB7A80320	BNWF	ThinkSystem 2.5" PM1653 3.84TB Read Intensive SAS 24Gb HS SSD	24	4	24	4
4XB7A80321	BP3E	ThinkSystem 2.5" PM1653 7.68TB Read Intensive SAS 24Gb HS SSD	24	4	24	4
2.5-inch hot-swap 6 Gb SATA SSDs						
4XB7A87526	BWKL	ThinkSystem 2.5" PM893a 1.92TB Read Intensive SATA 6Gb HS SSD	24	4	24	4
4XB7A87527	BWKK	ThinkSystem 2.5" PM893a 3.84TB Read Intensive SATA 6Gb HS SSD	24	4	24	4
4XB7A17103	BA7J	ThinkSystem 2.5" S4520 1.92TB Read Intensive SATA 6Gb HS SSD	24	4	24	4
4XB7A17104	BK77	ThinkSystem 2.5" S4520 3.84TB Read Intensive SATA 6Gb HS SSD	24	4	24	4
4XB7A17126	BA4T	ThinkSystem 2.5" S4620 960GB Mixed Use SATA 6Gb HS SSD	24	4	24	4
4XB7A17127	BA4U	ThinkSystem 2.5" S4620 1.92TB Mixed Use SATA 6Gb HS SSD	24	4	24	4

Part number	Feature	Description	Maximum supported			
			HX665 V3 IS	HX665 V3 Storage IS	HX665 V3 CN	HX665 V3 Storage CN
4XB7A17128	BK7L	ThinkSystem 2.5" S4620 3.84TB Mixed Use SATA 6Gb HS SSD	24	4	24	4
2.5-inch hot-swap PCIe 4.0 NVMe SSDs						
4XB7A13941	BMGD	ThinkSystem 2.5" U.2 P5520 1.92TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	20	No	20	No
4XB7A13631	BNEQ	ThinkSystem 2.5" U.2 P5520 15.36TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	20	No	20	No
4XB7B01867	C6MA	ThinkSystem 2.5" U.2 Solidigm P5520 1.92TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	20	No	20	No
4XB7B01868	C6MB	ThinkSystem 2.5" U.2 Solidigm P5520 3.84TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	20	No	20	No
4XB7B01869	C6MC	ThinkSystem 2.5" U.2 Solidigm P5520 7.68TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	20	No	20	No
4XB7B01870	C7NZ	ThinkSystem 2.5" U.2 Solidigm P5520 15.36TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	20	No	20	No
4XB7B01879	C6M2	ThinkSystem 2.5" U.2 Solidigm P5620 1.6TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	20	No	20	No
4XB7B01880	C6M3	ThinkSystem 2.5" U.2 Solidigm P5620 3.2TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	20	No	20	No
4XB7B01881	C6M4	ThinkSystem 2.5" U.2 Solidigm P5620 6.4TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	20	No	20	No
4XB7A17129	BNEG	ThinkSystem 2.5" U.2 P5620 1.6TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	20	No	20	No
4XB7A95055	C2BV	ThinkSystem 2.5" U.3 7500 MAX 1.6TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	20	No	20	No
4XB7A95056	C2BW	ThinkSystem 2.5" U.3 7500 MAX 3.2TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	20	No	20	No
4XB7A95057	C2BF	ThinkSystem 2.5" U.3 7500 MAX 6.4TB Mixed Use NVMe PCIe 4.0 x4 HS SSD	20	No	20	No
4XB7A95050	C2BR	ThinkSystem 2.5" U.3 7500 PRO 1.92TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	20	No	20	No
4XB7A95051	C2BS	ThinkSystem 2.5" U.3 7500 PRO 3.84TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	20	No	20	No
4XB7A95052	C2BT	ThinkSystem 2.5" U.3 7500 PRO 7.68TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	20	No	20	No
4XB7A95053	C2BU	ThinkSystem 2.5" U.3 7500 PRO 15.36TB Read Intensive NVMe PCIe 4.0 x4 HS SSD	20	No	20	No
3.5-inch hot-swap 12 Gb SAS HDDs						
7XB7A00043	AUU6	ThinkSystem 3.5" 4TB 7.2K SAS 12Gb Hot Swap 512n HDD	No	12	No	12
7XB7A00044	AUU7	ThinkSystem 3.5" 6TB 7.2K SAS 12Gb Hot Swap 512e HDD	No	12	No	12

Part number	Feature	Description	Maximum supported			
			HX665 V3 IS	HX665 V3 Storage IS	HX665 V3 CN	HX665 V3 Storage CN
7XB7A00045	B0YR	ThinkSystem 3.5" 8TB 7.2K SAS 12Gb Hot Swap 512e HDD	No	12	No	12
7XB7A00046	AUUG	ThinkSystem 3.5" 10TB 7.2K SAS 12Gb Hot Swap 512e HDD	No	12	No	12
7XB7A00067	B117	ThinkSystem 3.5" 12TB 7.2K SAS 12Gb Hot Swap 512e HDD	No	12	No	12
4XB7A80353	BPKU	ThinkSystem 3.5" 20TB 7.2K SAS 12Gb Hot Swap 512e HDD	No	12	No	12
4XB7A93007	C2BH	ThinkSystem 3.5" 24TB 7.2K SAS 12Gb Hot Swap 512e HDD	No	12	No	12
3.5-inch hot-swap 6 Gb SATA HDDs						
7XB7A00051	AUU8	ThinkSystem 3.5" 4TB 7.2K SATA 6Gb Hot Swap 512n HDD	No	12	No	12
7XB7A00052	AUUA	ThinkSystem 3.5" 6TB 7.2K SATA 6Gb Hot Swap 512e HDD	No	12	No	12
7XB7A00053	AUU9	ThinkSystem 3.5" 8TB 7.2K SATA 6Gb Hot Swap 512e HDD	No	12	No	12
7XB7A00054	AUUB	ThinkSystem 3.5" 10TB 7.2K SATA 6Gb Hot Swap 512e HDD	No	12	No	12
7XB7A00068	B118	ThinkSystem 3.5" 12TB 7.2K SATA 6Gb Hot Swap 512e HDD	No	12	No	12
4XB7A13914	B7F0	ThinkSystem 3.5" 16TB 7.2K SATA 6Gb Hot Swap 512e HDD	No	12	No	12
3.5-inch hot-swap 24 Gb SAS SSDs						
4XB7A80326	BNWH	ThinkSystem 3.5" PM1653 3.84TB Read Intensive SAS 24Gb HS SSD	No	12	No	12
4XB7A80327	BP3F	ThinkSystem 3.5" PM1653 7.68TB Read Intensive SAS 24Gb HS SSD	No	12	No	12
4XB7A80345	BNWA	ThinkSystem 3.5" PM1655 1.6TB Mixed Use SAS 24Gb HS SSD	No	12	No	12
3.5-inch hot-swap 6 Gb SATA SSDs						
4XB7A17121	BA7N	ThinkSystem 3.5" S4520 1.92TB Read Intensive SATA 6Gb HS SSD	No	12	No	12
4XB7A17122	BK7F	ThinkSystem 3.5" S4520 3.84TB Read Intensive SATA 6Gb HS SSD	No	12	No	12
4XB7A17138	BA4X	ThinkSystem 3.5" S4620 960GB Mixed Use SATA 6Gb HS SSD	No	12	No	12
4XB7A17139	BA4Y	ThinkSystem 3.5" S4620 1.92TB Mixed Use SATA 6Gb HS SSD	No	12	No	12
4XB7A17140	BK7P	ThinkSystem 3.5" S4620 3.84TB Mixed Use SATA 6Gb HS SSD	No	12	No	12
M.2- NVMe PCIe 4.0 x4 NHS SSD						
4XB7A13999	BKSR	ThinkSystem M.2 7450 PRO 960GB Read Intensive NVMe PCIe 4.0 x4 NHS SSD	2	2	2	2
4XB7A90102	BXMH	ThinkSystem M.2 PM9A3 960GB Read Intensive NVMe PCIe 4.0 x4 NHS SSD	2	2	2	2
7mm NVMe PCIe 4.0						
4XB7A90096	BXMN	ThinkSystem 7mm U.2 PM9A3 960GB Read Intensive NVMe PCIe 4.0 x4 HS SSD	2	2	2	2
4XB7A82853	BPZ4	ThinkSystem 7mm U.3 7450 PRO 960GB Read Intensive NVMe PCIe 4.0 x4 HS SSD	2	2	2	2

Note: NVMe serviceability has improvements planned for AOS 6.8. Before AOS 6.8 some features, like hot-swap, are not enabled. To replace a NVMe drive, please follow Nutanix's documentation for drive replacement without VMD on the portal – <https://my.nutanix.com/>.

Network adapters

The HX665 V3 support the following networking options.

For details about these options, including configuration rules, see the SR665 V3 product guide:

<https://lenovopress.com/lp1608-thinksystem-sr665-v3-server#i-o-expansion>

<https://lenovopress.com/lp1608-thinksystem-sr665-v3-server#network-adapters>

Note: When using different vendor NICs, failover is not supported between these NICs. When possible, select only one vendor for network adapters. When multiple vendors must be used, ensure that redundant links are on NICs from the same vendor to avoid issues.

Table 12. OCP network adapters

Part number	Feature	Description	Maximum supported			
			HX665 V3 IS	HX665 V3 CN	HX665 V3 Storage IS	HX665 V3 Storage CN
10 Gb Ethernet						
4XC7A08240	B5T4	ThinkSystem Broadcom 57454 10GBASE-T 4-port OCP Ethernet Adapter	1	1	1	1
4XC7A08236	B5ST	ThinkSystem Broadcom 57416 10GBASE-T 2-port OCP Ethernet Adapter	1	1	1	1
25 Gb Ethernet						
4XC7A08237	BN2T	ThinkSystem Broadcom 57414 10/25GbE SFP28 2-Port OCP Ethernet Adapter	1	1	1	1
4XC7A80567	BPPW	ThinkSystem Broadcom 57504 10/25GbE SFP28 4-Port OCP Ethernet Adapter	1	1	1	1
4XC7A62582	BE4T	ThinkSystem Mellanox ConnectX-6 Lx 10/25GbE SFP28 2-Port OCP Ethernet Adapter	1	1	1	1

Table 13. PCIe network adapters

Part number	Feature	Description	Maximum supported			
			HX665 V3 IS	HX665 V3 CN	HX665 V3 Storage IS	HX665 V3 Storage CN
10GBASE-T Ethernet						
4XC7A08245	B5SU	ThinkSystem Broadcom 57454 10GBASE-T 4-port PCIe Ethernet Adapter	2	2	5	5
7ZT7A00496	AUKP	ThinkSystem Broadcom 57416 10GBASE-T 2-Port PCIe Ethernet Adapter	2	2	5	5
25 Gb Ethernet						
4XC7A08238	BK1H	ThinkSystem Broadcom 57414 10/25GbE SFP28 2-port PCIe Ethernet Adapter	2	2	5	5
4XC7A80566	BNWM	ThinkSystem Broadcom 57504 10/25GbE SFP28 4-Port PCIe Ethernet Adapter	2	2	5	5
4XC7A62580	BE4U	ThinkSystem Mellanox ConnectX-6 Lx 10/25GbE SFP28 2-Port PCIe Ethernet Adapter	2	2	5	5
100 Gb Ethernet						
4XC7A08248	B8PP	ThinkSystem Mellanox ConnectX-6 Dx 100GbE QSFP56 2-port PCIe Ethernet Adapter	2	2	5	5

GPU adapters

The HX665 V3 support the following GPU options.

To ensure that the controlled GPUs and accelerators are only sold in the supported markets, the following configure-to-order base machine-type models (CTO MTMs) are selectable in DCSC:

- **Standard Open models** are available in all markets worldwide. Controlled GPUs cannot be configured using these models. These are CTO1WW models.
- **GPU Controlled models** are used to order any of the controlled GPUs and accelerators. Controlled models are not available in affected markets. If you start from a controlled model, your configuration must include a controlled GPUs.

Note:

- For all models listed in the GPU **Controlled models** column, one of the controlled GPUs *must* be selected in the DCSC configurator. DCSC will display an error if you configuration does not include one of the controlled GPUs.
- It is highly recommended to engage a Lenovo representative early in a project that includes the ThinkAgile HXSeries Integrated Systems and Certified Nodes

Configuration Note:

- Some GPUs are only available with VMware ESXi selected as the hypervisor
- Some GPUs are unavailable because of government restriction in certain markets.

- L40S requires requires “AOS 6.7.1.5 release or later or ESXi
- A2 support in AHV is planned for AOS 6.9

For details about these options, including configuration rules, see the SR665 V3 product guide:

<https://lenovopress.com/lp1608-thinksystem-sr665-v3-server#gpu-adapters>

Table 14. GPU adapters

Part number	Feature	Description	Maximum supported					
			HX665 V3 IS	HX665 V3 IS w/Cntrl GPU	HX665 V3 Storage IS	HX665 V3 CN	HX665 V3 CN w/Cntrl GPU	HX665 V3 Storage CN
Double-wide GPUs								
4X67A76581	BQZR	ThinkSystem NVIDIA A30 24GB PCIe Gen4 Passive GPU w/o CEC	No	3	No	No	3	No
4X67A90669	BYFH	ThinkSystem NVIDIA L40S 48GB PCIe Gen4 Passive GPU	No	3	No	No	3	No
4X67A76727	BQZU	ThinkSystem NVIDIA A16 64GB Gen4 PCIe Passive GPU w/o CEC	3	No	No	3	No	No
4X67A89325	BXAK	ThinkSystem NVIDIA H100 NVL 94GB PCIe Gen5 Passive GPU	No	3	No	No	3	No
Single-wide GPUs								
4X67A81547	BQZT	ThinkSystem NVIDIA A2 16GB PCIe Gen4 Passive GPU w/o CEC	8	No	No	8	No	No
4X67A84824	BS2C	ThinkSystem NVIDIA L4 24GB PCIe Gen4 Passive GPU	No	5	No	No	5	No

Software

The systems support the hypervisors listed in the following table. Hypervisors are installed on the 1x M.2 SSDs.

Table 15. Hypervisors

Feature code	Description	Quantity
B15S	Nutanix SW Stack on Nutanix AHV	1
BG4Z	Nutanix SW Stack on VMware ESXi 6.7	1
BFT6	Nutanix SW Stack on VMware ESXi 7.0	1

Configuration notes:

- In ESXi-based environments, HX Series Integrated systems require VMware vCenter Server.
- The HX Certified Nodes support firmware updates from Nutanix Prism with the ThinkAgile HX Lifecycle Manager (UEFI, XCC, drives, network adapters, and SAS HBAs)

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 integrated system 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>

Nutanix Portfolio 2.0 (PnP) Licensing Model

Nutanix is introducing an enterprise-ready unified cloud platform with our HCI solution as the foundation. The new, simplified product portfolio includes: Nutanix Cloud Platform (NCP), Nutanix Cloud Infrastructure (NCI) and Nutanix Cloud Manager (NCM), NCI-Data with 3 license tiers for each software edition. There are additional packages, Nutanix Unified Storage, Nutanix Database Service (NDB), and Nutanix Desktop Services (NDS), Virtual Desktop Infrastructure (VDI) & Nutanix Frame that are available.

The Nutanix software is available for all base CTO models.

The editions have the following characteristics:

Table 16. Software Editions

License Tier	Nutanix Cloud Platform (NCP)	Nutanix Cloud Infrastructure (NCI)	Nutanix Cloud Manager (NCM)	NCI-Data
Ultimate	<ul style="list-style-type: none">• NCI Ultimate• NCM Ultimate	<ul style="list-style-type: none">• Advanced DR: Sync, Near-Sync,• Runbook Security: Micro-segmentation, Encryption• Cloud Native: Kubernetes Services	<ul style="list-style-type: none">• Application Automation• Security General	<ul style="list-style-type: none">• No Mseg• No Karbon
Pro	<ul style="list-style-type: none">• NCI Ultimate• NCM Pro	<ul style="list-style-type: none">• Multisite Async DR• Overlay Networking	<ul style="list-style-type: none">• Self Service Cost Governance	<ul style="list-style-type: none">• No Flow Networking
Starter	<ul style="list-style-type: none">• NCI Pro• NCM Pro	<ul style="list-style-type: none">• AOS Storage + Compression + Dedup	<ul style="list-style-type: none">• AI Operations	<ul style="list-style-type: none">• No AHV Support

Nutanix Cloud Platform (NCP)

Nutanix Cloud Platform is the complete software edition package that includes both Nutanix Cloud Infrastructure (NCI) and Nutanix Cloud Manager (NCM). It is available in several editions to meet your infrastructure needs with the right set of capabilities.

Nutanix Cloud Infrastructure (NCI)

Nutanix Cloud Infrastructure (NCI) is a complete software stack to unify your hybrid cloud infrastructure including compute, storage and network, hypervisors and containers, in public or enterprise clouds; all with built-in resilience, self-healing, disaster recovery capabilities, and security. It includes enterprise data services and consolidated storage, data protection and disaster recovery, native virtualization and container management, networking and security.

For details on software editions see <https://www.nutanix.com/products/cloud-platform/software-options#nci>

Nutanix Cloud Manager (NCM)

Nutanix Cloud Manager (NCM) offers our customers simplicity and ease of use to build and grow their cloud deployments faster and realize rapid ROI, by providing intelligent operations, self service and orchestration, visibility and governance of spend, security and teams, all through a unified Multi-cloud management solution.

For details on software editions see <https://www.nutanix.com/products/cloud-platform/software-options#ncm>

Nutanix Unified Storage

Nutanix Unified Storage provides software-defined, scale-out storage solutions for enterprise NAS and object workloads for unstructured data, block storage for structured data, and backup storage. Nutanix Unified Storage replaces traditional independent storage services and brings NAS, object, and block workloads into a consolidated unified storage platform with all its benefits, including a unified control plane.

Nutanix Data Lens delivers cloud-based data governance for unstructured data stored in the Nutanix Unified Storage platform, including data lifecycle management, data security, ransomware protection, and audit compliance.

Nutanix Unified Storage and Data Lens are purchased and licensed on a per TiB usable basis.

For details on software editions see <https://www.nutanix.com/products/cloud-platform/software-options#nus>

Nutanix Database Service

Nutanix Database Service (NDB) is a Hybrid Multicloud DBaaS that enables small, nimble teams of DBAs to easily manage large fleets of databases using a single console and API, while enabling developers to self-service their database requests. NDB is purchased and licensed on a per core basis and is available either as a standalone or as an add-on to NCI. In the standalone version, NDB includes NCI Ultimate functionality in addition to database-specific capabilities and is licensed on a per-core basis.

For details on software editions see <https://www.nutanix.com/products/cloud-platform/software-options#database>

Nutanix Virtual Desktop Infrastructure (VDI) & Nutanix Frame

The Nutanix VDI per user model offers hybrid cloud infrastructure capabilities appropriate for on-prem virtual desktop infrastructure (VDI) and Desktop as a Service (DaaS) use cases with pricing based on a Maximum Concurrent User basis (maximum number of provisioned end-user VMs). VDI per user is an alternative to the core-based NCI licensing option and is designed to provide simple, transparent licensing for all VDI users, regardless of the underlying hardware, hypervisor, or cloud.

- Agnostic: Works with any EUC management platform including Citrix Virtual Apps & Desktops and VMware Horizon
- Term license: 1-year through 5-year options
 - Term license must run on a dedicated software licensed VDI cluster with no core-based licensing. Mixing of non-VDI workloads is not supported.

- Unified Storage: Built-in and also available as a per TiB base add-on
- No additional license cost for DR site
- Portable across on-premises and public cloud, public cloud use requires Ultimate edition
- Available in Starter, Pro, and Ultimate editions
- Cloud Native and Database Service Add-ons not available with NCI VDI. Advanced Replication and Security Add-on features require NCI Ultimate edition

For details on software editions see <https://www.nutanix.com/products/cloud-platform/software-options#vdi>

License Options

ThinkAgile HX can be configured with one of the latest Nutanix software editions that are listed in the following table.

Table 17. Nutanix license options

Feature code	Description	Quantity Required
BVKU	Nutanix Cloud Platform Starter Edition	1 per node
BVKW	Nutanix Cloud Platform Pro Edition	1 per node
BVKY	Nutanix Cloud Platform Ultimate Edition	1 per node
BSPJ	Nutanix Cloud Infrastructure Starter Edition	1 per node
BSPG	Nutanix Cloud Infrastructure Pro Edition	1 per node
BSPL	Nutanix Cloud Infrastructure Ultimate Edition	1 per node
BSQ0	Nutanix Cloud Manager Starter Edition	1 per node
BSPY	Nutanix Cloud Manager Pro Edition	1 per node
BSQ2	Nutanix Cloud Manager Ultimate Edition	1 per node
BSPQ	NCI-Data Starter Edition	1 per node
BSPN	NCI-Data Pro Edition	1 per node
BSPS	NCI-Data Ultimate Edition	1 per node
BSQH	Nutanix Database Service (NDB) Platform	1 per node
BSQ7	End User Computing (EUC) Starter	1 for every 200 concurrent users
BSQ5	End User Computing (EUC) Pro	1 for every 200 concurrent users
BSQ9	End User Computing (EUC) Ultimate	1 for every 200 concurrent users
BSQD	Nutanix Unified Storage (NUS) Starter	1 per Tib
BSQB	Nutanix Unified Storage (NUS) Pro	1 per Tib

Warranty and Support

The ThinkAgile HX Series Integrated systems can be configured with a three-, four, or five-year hardware warranty with 24x7 ThinkAgile Premier Single Point of Support (Lenovo integrated systems hardware and Nutanix 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.

The Lenovo local support centers perform problem determination and resolution for hardware-related issues and escalate to Nutanix, on behalf of the customer, for software-related problem determination. Nutanix will contact the customer and will own the software-related problem resolution until closure.

For more information refer to the Lenovo Support Plan - ThinkAgile HX Integrated System and Lenovo Converged HX Series

<https://datacentersupport.lenovo.com/us/en/solutions/ht505404>

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 HX665 V3 Integrated Systems and Certified Nodes have a 3-year warranty:

- 7D9N - 2U Integrated System - 3 year warranty
- 7D9N - 2U Certified Node - 3 year warranty

Our global network of regional support centers offers consistent, local-language support enabling you to vary response times and level of service to match the criticality of your support needs:

- **Standard Next Business Day** – Best choice for non-essential systems requiring simple maintenance.
- **Premier Next Business Day** – Best choice for essential systems requiring technical expertise from senior-level Lenovo engineers.
- **Premier 24x7 4-Hour Response** – Best choice for systems where maximum uptime is critical.
- **Premier Enhanced Storage Support 24x7 4-Hour Response** – Best choice for storage systems where maximum uptime is critical.

For more information, consult the brochure [Lenovo Operational Support Services for Data Centers Services](#).

Deployment services

The following optional Lenovo Professional Services are available to get customers up and running quickly.

- Basic Hardware Installation Services
 - Unpacking and inspecting the systems
 - Installing options and mounting the systems in a rack cabinet
 - 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)

- Nutanix deployment services - Base (per node)
 - Conducting remote preparation and planning
 - Verifying firmware versions and performing firmware updates, if needed
 - Installing and configuring hypervisor and Nutanix controller VM
 - Creating Nutanix cluster
 - Configuring storage
 - Configuring administrative features
- Nutanix deployment services - Advanced (per cluster)
 - Configuring and integrating a virtualized environment
 - Nutanix containers and Acropolis (AHV) cluster
 - VMware vCenter Server and vSphere cluster (for VMware installations)
 - Transferring knowledge
- Nutanix deployment services - Advanced with XClarity (per cluster)
 - Nutanix deployment services - Advanced
 - Installing Lenovo XClarity
 - Configuring Lenovo XClarity network settings and performing discovery and inventory
 - Installing system updates

The following table lists ThinkAgile Health Check & Deployment offerings are available for ThinkAgile HX customers. These offerings are performed by Lenovo Professional Services.

- **Onsite Deployment:** Install, configure, and validate solution on-site, and conduct knowledge transfer.
- **Remote Deployment:** Install, configure, and validate solution remotely, and conduct knowledge transfer.
- **Remote Health Check:** Report & remediation of hardware and cluster health issues, including firmware and software updates.

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

Table 18. Deployment offerings

Part number	Description
Onsite deployment services	
5MS7B00043	ThinkAgile HX Onsite Deployment (up to 3 nodes)
5MS7B00044	ThinkAgile HX Onsite Deployment (additional node)
Remote deployment services	
5MS7B00045	ThinkAgile HX Remote Deployment (up to 3 nodes)
5MS7B00046	ThinkAgile HX Remote Deployment (additional node)
5MS7A27430	ThinkAgile HX SAP HANA Deployment - Custom
Remote Health Check	
5MS7B00065	ThinkAgile HX 1X Remote Health Check (up to 3 node cluster)
5MS7B00066	ThinkAgile HX 1X Remote Health Check (additional node)
5MS7B00067	ThinkAgile HX 1X Remote Health Check & Update (up to 3 node cluster)
5MS7B00068	ThinkAgile HX 1X Remote Health Check & Update (additional node)

For more information, refer to the Data Center Implementation Services web page:
<https://www.lenovo.com/us/en/data-center/services/implementation-services/>

Lenovo TruScale

Lenovo TruScale XaaS is your set of flexible IT services that makes everything easier. Streamline IT procurement, simplify infrastructure and device management, and pay only for what you use – so your business is free to grow and go anywhere.

Lenovo TruScale is the unified solution that gives you simplified access to:

- The industry's broadest portfolio – from pocket to cloud – all delivered as a service
- A single-contract framework for full visibility and accountability
- The global scale to rapidly and securely build teams from anywhere
- Flexible fixed and metered pay-as-you-go models with minimal upfront cost
- The growth-driving combination of hardware, software, infrastructure, and solutions – all from one single provider with one point of accountability.

For information about Lenovo TruScale offerings that are available in your region, contact your local Lenovo sales representative or business partner.

Lenovo Financial Services

Why wait to obtain the technology you need now? No payments for 90 days and predictable, low monthly payments make it easy to budget for your Lenovo solution.

- **Flexible**

Our in-depth knowledge of the products, services and various market segments allows us to offer greater flexibility in structures, documentation and end of lease options.

- **100% Solution Financing**

Financing your entire solution including hardware, software, and services, ensures more predictability in your project planning with fixed, manageable payments and low monthly payments.

- **Device as a Service (DaaS)**

Leverage latest technology to advance your business. Customized solutions aligned to your needs. Flexibility to add equipment to support growth. Protect your technology with Lenovo's Premier Support service.

- **24/7 Asset management**

Manage your financed solutions with electronic access to your lease documents, payment histories, invoices and asset information.

- **Fair Market Value (FMV) and \$1 Purchase Option Leases**

Maximize your purchasing power with our lowest cost option. An FMV lease offers lower monthly payments than loans or lease-to-own financing. Think of an FMV lease as a rental. You have the flexibility at the end of the lease term to return the equipment, continue leasing it, or purchase it for the fair market value. In a \$1 Out Purchase Option lease, you own the equipment. It is a good option when you are confident you will use the equipment for an extended period beyond the finance term. Both lease types have merits depending on your needs. We can help you determine which option will best meet your technological and budgetary goals.

Ask your Lenovo Financial Services representative about this promotion and how to submit a credit application. For the majority of credit applicants, we have enough information to deliver an instant decision and send a notification within minutes.

Seller training courses

The following sales training courses are offered for employees and partners (login required). Courses are listed in date order.

1. **Family Portfolio: ThinkAgile Systems**

2025-04-30 | 45 minutes | Employees and Partners

This course covers the foundational components of the ThinkAgile family, including server configurations, key system differences, and the unique features of the HX, MX, and VX product families.

By the end of this course, you should be able to:

- List the ThinkSystem and ThinkEdge servers that the ThinkAgile family is based on
- Explain the difference between Certified Nodes and Integrated Systems
- List two features each of the HX, MX, and VX families

Tags: ThinkAgile, ThinkSystem

Published: 2025-04-30

Length: 45 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: SXSW2150r2

2. **Partner Technical Webinar - Storage Announcements**

2025-04-29 | 60 minutes | Employees and Partners

In this 60-minute replay, the April 23 Storage Announcement was presented. Adam Mandelbloom, Lenovo Technical Marketing Manager, presented the ThinkAgile announcements. Next, Roger Yarosh, Senior Storage Product Manager, presented the DG and DM announcements.

Tags: Data Management, ThinkAgile

Published: 2025-04-29

Length: 60 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: 042525

3. **Think AI Weekly: Simplifying AI Deployments with ThinkAgile**

2025-04-11 | 54 minutes | Employees Only

Please view this session to hear Adam Mandelbloom, Technical Marketing Manager for ISG explain these topics:

- Overall value proposition of ThinkAgile in AI solutions
- Use cases for ThinkAgile HX
- Use cases for ThinkAgile VX and MX

Tags: Artificial Intelligence (AI), ThinkAgile

Published: 2025-04-11

Length: 54 minutes

Start the training:

Employee link: Grow@Lenovo

Course code: DTAIW137

4. **Lenovo TruScale for Hosted Desktops with Nutanix**

2025-02-04 | 15 minutes | Employees and Partners

By exemplifying the case of a customer who wants to move to a remote desktop public cloud solution, this 15-minute course offers an overview of the Lenovo TruScale for Hosted Desktops with Nutanix solution, including benefits, architecture, and value proposition.

After completing this course, you will be able to describe the Lenovo TruScale for Hosted Desktops with Nutanix solution, articulate the value proposition of this Hosted Desktops solution, and identify opportunities for this Lenovo-Nutanix solution.

Tags: ThinkAgile, TruScale

Published: 2025-02-04

Length: 15 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DSOLO109

5. **Selling On Prem Value - Private Cloud and Private AI**

2024-12-13 | 40 minutes | Employees Only

This course provides Lenovo Sellers with a series of five videos that are designed to help you better articulate our joint value in the Private Cloud and Private AI solution opportunity. After completing this course, Lenovo Sellers should be prepared to elevate customer discussions by transitioning from product features to explaining value-driven benefits, enabling a deeper understanding of the strategic impact for their business.

Tags: Artificial Intelligence (AI), Industry solutions, Technology solutions, ThinkAgile, VMware

Published: 2024-12-13

Length: 40 minutes

Start the training:

Employee link: Grow@Lenovo

Course code: DVMB101

6. **Partner Technical Webinar - Data Center 101 - Why HCI? Why 3-tier?**

2024-11-14 | 60 minutes | Employees and Partners

October 11, 2024 – In this 60-minute webinar Alex Docherty, Channel Technical Strategist, discussed When to HCI vs 3 Tier.

Tags: ThinkAgile, ThinkSystem

Published: 2024-11-14

Length: 60 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: 101124

7. ThinkAgile Solutions for AI - Security and Compliance Considerations

2024-10-01 | 15 minutes | Employees and Partners

This course, tailored specifically for Lenovo and its partner technical sellers, is designed to equip participants with essential knowledge and skills to effectively assess security measures and address compliance considerations for ThinkAgile Solutions for AI.

Upon completion of this training, you will be able to:

- Describe security features of ThinkAgile for AI data protection.
- Explain how to mitigate risk and address compliance considerations in AI deployments.

Last Updated: September 2024

Tags: Artificial Intelligence (AI), High-Performance Computing (HPC), ThinkAgile

Published: 2024-10-01

Length: 15 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DCLDAI203

8. Integration of ThinkAgile and AI

2024-09-11 | 25 minutes | Employees and Partners

Designed specifically for Lenovo and its partner technical sellers, this course aims to equip you with the knowledge and skills to effectively communicate the integration of ThinkAgile Solutions and AI.

Upon completion of this training, you will be able to:

- Highlight the advantages of using ThinkAgile for AI workloads
- Explore how ThinkAgile platforms are specifically optimized for AI

Last Updated: September 2024

Tags: Artificial Intelligence (AI), ThinkAgile

Published: 2024-09-11

Length: 25 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DCLDAI204

9. Key Features of Lenovo ThinkAgile Solutions for AI

2024-09-10 | 15 minutes | Employees and Partners

Designed specifically for Lenovo and its partner technical sellers, this course aims to equip you with the knowledge and skills to effectively communicate the key features of ThinkAgile Solutions for AI. By completing this course, you'll be better prepared to understand customer needs and present the most suitable AI solutions, ensuring successful engagements and driving value for your clients.

In this course, you will learn how to:

- Present compute capabilities for AI processing
- Articulate optimized storage solutions with ThinkAgile for high-speed AI performance
- Identify essential networking considerations for ThinkAgile AI workloads
- Present ThinkAgile AI Ready solutions

Last Updated: September 2024

Tags: Artificial Intelligence (AI), ThinkAgile

Published: 2024-09-10

Length: 15 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DCLDAI201

10. ThinkAgile Solutions for AI - Sales Strategies and Messaging

2024-09-06 | 15 minutes | Employees and Partners

This course is designed exclusively for Lenovo and its partner technical sales teams, with the goal of empowering you with the knowledge and strategies necessary to effectively engage customers in conversations about ThinkAgile Solutions for AI.

In this course, you'll learn how to:

- Identify customer pain points.
- Recommend ThinkAgile Solutions for AI tailored to those needs. And lastly,
- Communicate the benefits of ThinkAgile for AI to key stakeholders.

Last Updated: September 2024

Tags: Artificial Intelligence (AI), ThinkAgile

Published: 2024-09-06

Length: 15 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DCLDAI202

11. **Position Lenovo ThinkAgile Solutions for AI**
2024-08-19 | 10 minutes | Employees and Partners

Designed specifically for Lenovo and partner technical sellers, this course aims to equip you with the knowledge and skills necessary to effectively evaluate and position ThinkAgile Solutions for AI to your customers. By completing this course, you will be better prepared to understand customer needs and present the most suitable AI solutions, ensuring successful engagements and driving value for your clients.

In this course, you will learn how to position ThinkAgile Solutions for AI to your customers by:

- Evaluating the key challenges in the enterprise landscape
- Advocating the value proposition of ThinkAgile Hyper-Converged Infrastructure
- Exploring use cases of ThinkAgile in AI environments
- Implementing ThinkAgile-based AI deployments

Tags: Artificial Intelligence (AI), ThinkAgile

Published: 2024-08-19

Length: 10 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DCLDAI200

12. **ThinkAgile Roadshow for Account Managers**
2024-06-21 | 60 minutes | Employees Only

As customers transition through technology refresh and modernize their IT, learn how to win and position ThinkAgile portfolio. Get an overview of current ThinkAgile momentum and strategy along with best practices in product positioning

Tags: Artificial Intelligence (AI), Cloud, Microsoft, Nutanix, ThinkAgile, VMware

Published: 2024-06-21

Length: 60 minutes

Start the training:

Employee link: Grow@Lenovo

Course code: DTAO101

13. **SAP Webinar for Lenovo Sellers: Lenovo Portfolio Update for SAP Landscapes**

2024-06-04 | 60 minutes | Employees Only

Join Mark Kelly, Advisory IT Architect with the Lenovo Global SAP Center of Competence as he discusses:

- Challenges in the SAP environment
- Lenovo On-premise Solutions for SAP
- Lenovo support resources for SAP solutions

Tags: SAP, ThinkAgile, ThinkEdge, ThinkSystem

Published: 2024-06-04

Length: 60 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Course code: DSAPF101

14. **Lenovo Data Center Product Portfolio**

2024-05-29 | 20 minutes | Employees and Partners

This course introduces the Lenovo data center portfolio, and covers servers, storage, storage networking, and software-defined infrastructure products. After completing this course about Lenovo data center products, you will be able to identify product types within each data center family, describe Lenovo innovations that this product family or category uses, and recognize when a specific product should be selected.

Tags: Advanced DataCenter, DataCenter Products, ThinkAgile, ThinkEdge, ThinkSystem

Published: 2024-05-29

Length: 20 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: SXXW1110r7

15. **VTT Cloud Architecture: NVIDIA Using Cloud for GPUs and AI**

2024-05-22 | 60 minutes | Employees Only

Join JD Dupont, NVIDIA Head of Americas Sales, Lenovo partnership and Veer Mehta, NVIDIA Solution Architect on an interactive discussion about cloud to edge, designing cloud Solutions with NVIDIA GPUs and minimizing private\hybrid cloud OPEX with GPUs. Discover how you can use what is done at big public cloud providers for your customers. We will also walk through use cases and see a demo you can use to help your customers.

Tags: Artificial Intelligence (AI), Cloud, Nvidia, Software Defined Infrastructure (SDI), Technical Sales

Published: 2024-05-22

Length: 60 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Course code: DVCLD212

16. **Start the Conversation - Lenovo Cloud Strategy**

2024-05-20 | 25 minutes | Employees and Partners

The purpose of this course is to help sellers use the Lenovo cloud strategy as a foundation to start the customer cloud conversation.

Course Objectives:

- Understand why customers choose the cloud
- Describe the Lenovo Cloud Strategy
- Be able to start the customer cloud conversation

Tags: Cloud, Technology solutions

Published: 2024-05-20

Length: 25 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DCLDS103r3

17. **Partner Technical Webinar - Thinkagile HX Update**

2024-05-08 | 60 minutes | Employees and Partners

In this 60-minute replay, Adam Mandelbloom, Technical Product Manager - ISG SDI, educated us with an update on Thinkagile HX. He also touched on “What’s New” as well as gave HX strategic positioning.

Tags: Nutanix

Published: 2024-05-08

Length: 60 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: 042624

18. **VTT Cloud and Edge Architecture: Principal Consultant Overview**

2024-04-10 | 50 minutes | Employees Only

Join Ruth Miller, Lenovo Principal Consultant, SSG Services for a data-led discussions to examine in detail customer IT environments, highlighting pain points, performance issues, edge and hybrid cloud strategy and carbon reduction capability.

Examples of workshop deliverables and outcomes will be discussed to illustrate the value of early engagement and discovery.

Tags: Cloud, Services, Sustainability, Technology solutions, TruScale Infrastructure as a Service

Published: 2024-04-10

Length: 50 minutes

Start the training:

Employee link: Grow@Lenovo

Course code: DVCLD211

19. **VTT Data Management How to sell storage - April 2024**
2024-04-10 | 60 minutes | Employees Only

In this course, you will know:

- Why do we sell storage?
- What are the basics you need to get an opportunity rolling?
- Why Lenovo for Storage?
- What is happening in the market today?
- How to determine traction?

Tags: Data Management, Storage

Published: 2024-04-10

Length: 60 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Course code: DVDAT209

20. **Data management Overview**
2024-03-14 | 25 minutes | Employees and Partners

After completing this course you will be able to:

1. Know more about the data management trends and challenges
2. Understand the data management portfolio
3. Find out how data drives business value

Tags: Data Management, Storage, ThinkSystem

Published: 2024-03-14

Length: 25 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DSTOO201

21. **Technical Overview: ThinkAgile HCI and Cloud Platforms**

2024-03-07 | 35 minutes | Employees and Partners

This course is designed to give Lenovo sales and partner representatives a technical overview of Lenovo's ThinkAgile hyperconverged infrastructure and cloud platforms. Turnkey cloud platforms along with their architectural makeup, and container and data protection solutions are also covered.

Learning Objectives:

- Describe Lenovo's ThinkAgile hyperconverged infrastructure and cloud platforms
- Explain do-it-yourself and turnkey cloud platforms along with their architectural makeup
- Describe container and data protection solutions

Tags: Architecture, Engineering & Construction, Cloud, Technical Sales, ThinkAgile

Published: 2024-03-07

Length: 35 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DCLDT2001r3

22. **Lenovo HX Business Conversations**

2024-03-06 | 20 minutes | Employees and Partners

This course covers business conversations for Lenovo HX Hyperconverged solutions.

Course objectives:

- Identify a potential Lenovo HX opportunity
- Conduct effective discovery to reveal the customer's data center needs
- Probe the customer
- Ensure the customer knows you understand their issue(s)

Tags: DataCenter Products, Nutanix, Storage

Published: 2024-03-06

Length: 20 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DCGHXB001

23. **Family Introduction: Converged and Hyperconverged**

2024-01-25 | 15 minutes | Employees and Partners

This course is designed to give Lenovo sales a foundation on the characteristics of the Converged and Hyperconverged family. As an introduction to each family, this course also includes positioning, when to use a family and product, and keywords a client may use when discussing a converged or hyperconverged product.

Objectives:

- Family characteristics
- Priority positioning
- Product usage
- Key words and phrases

Tags: Sales, Storage

Published: 2024-01-25

Length: 15 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: SXSW1101r2

24. **VEEAM Solutions Sales Training**

2023-09-27 | 20 minutes | Employees and Partners

In this course you will learn about Hyper-availability for the Always-On Enterprise.

By the end of this training, you should be able to:

Identify and explain the core products and solutions offered by Veeam.

Explain the key benefits and value propositions of integrating Veeam solutions with Lenovo products.

Tags: Sales

Published: 2023-09-27

Length: 20 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DSTOO100

25. **A Seller's Guide to Nutanix OEM 2.0**

2023-08-24 | 90 minutes | Employees Only

In this Sales Team webinar, Mike Tilt, Ritu Jain and Brandon Saxton will cover the new Nutanix 2.0 pricing and packaging options to guide sellers on what the different types of offers, sales process and how to sell Nutanix 2.0. You will get an overview of OEM 2.0, Sales Process, PNP Pricing and Zone Information, and additional resources on Upgrade & Renewal SKUs and process.

Course Objectives

- Defining Nutanix 2.0 Pricing and Packaging
- Describing OEM 2.0 Sales Process
- Identifying resources and support

Tags: Nutanix, OEM, Sales

Published: 2023-08-24

Length: 90 minutes

Start the training:

Employee link: Grow@Lenovo

Course code: DSXNS101

26. **Empowering Technical Sellers: Excelling In Transactional Workloads**

2023-08-18 | 60 minutes | Employees and Partners

This training abstract outlines a comprehensive program designed to equip technical sellers with the knowledge and expertise required to effectively promote and sell Lenovo and Nutanix solutions for transactional workloads. By focusing on the unique capabilities and advantages of Lenovo and Nutanix infrastructure in handling high-performance transactional applications, this training program empowers technical sellers to engage with customers, understand their specific workload requirements, and articulate the value proposition of Lenovo and Nutanix offerings in this domain.

The training program encompasses the following key areas:

1. Transactional Workloads Overview:
2. Lenovo and Nutanix Solutions for Transactional Workloads:
3. Product Portfolio Deep Dive:
4. Addressing Customer Requirements:
5. Solution Positioning and Sales Techniques:
6. Competitor Analysis:

Through this training, technical sellers will acquire the expertise necessary to engage with customers, understand their transactional workload requirements, and effectively position Lenovo and Nutanix solutions as the ideal choice for high-performance, mission-critical applications. By understanding the intricacies of Lenovo and Nutanix offerings in the transactional workload space, technical sellers will be empowered to drive successful sales engagements, build strong customer relationships, and contribute to the growth and success of their organization.

Tags: Cloud, Nutanix, ThinkAgile

Published: 2023-08-18

Length: 60 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DHXD201

27. **Empowering Technical Sellers: Accelerating Lenovo and Nutanix Cloud Native-Container Application Solutions**

2023-08-18 | 60 minutes | Employees and Partners

This training abstract outlines a comprehensive program specifically designed to equip technical sellers with the knowledge and expertise needed to effectively promote and sell Lenovo and Nutanix cloud native/container application solutions. By focusing on the integration of Lenovo and Nutanix technologies with modern application development practices, this training enables tech sellers to engage with customers, understand their requirements, and articulate the unique value proposition of Lenovo and Nutanix offerings in the cloud native and containerization landscape.

The training encompasses the following key areas:

1. Cloud Native and Containerization Fundamentals:
2. Lenovo and Nutanix Solutions Overview:
3. Product Portfolio Deep Dive:
4. Addressing Customer Needs:
5. Solution Positioning and Sales Techniques:
6. Competitor Analysis:
7. Technical Demonstration and Proof-of-Concept:

Throughout the training, tech sellers will gain the expertise necessary to engage with customers, understand their unique requirements, and effectively position Lenovo and Nutanix solutions as the go-to choice for cloud native and containerized application needs. By learning the intricacies of Lenovo and Nutanix offerings, technical sellers will be equipped to drive successful sales engagements, strengthen customer relationships, and contribute to the overall growth and success of the organization.

Tags: Business solutions, Cloud, Nutanix, ThinkAgile

Published: 2023-08-18

Length: 60 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DHXC201

28. **ThinkAgile Accelerating Cloud Agility: HX Series Technical Presentation**

2023-07-28 | 40 minutes | Employees and Partners

Amalu Santhosh, Lenovo Technical Product Manager, reviews the ThinkAgile HX product portfolio. She will walk you through a technical deep dive into HX workloads and discuss technical details and performance of the latest ThinkAgile HX solutions.

Tags: ThinkAgile

Published: 2023-07-28

Length: 40 minutes

Start the training:

Employee link: Grow@Lenovo

Partner link: [Lenovo Partner Learning](#)

Course code: DHXT201

29. **Cloud and HCI or Somewhere in Between**

2023-07-11 | 40 minutes | Employees and Partners

Provides a brief overview of Lenovo Portfolio for HCI and Cloud including ThinkAgile HX, VX, MX Certified Nodes and Appliances, Azure, and Engineered Cloud Solutions. Review Scenarios and complete questions "choose your own adventure" to identify and qualify an opportunity as HCI or Cloud and which portfolio solution would be the best option.

Course objectives:

- Where in the Sales Cycle we are
- What is Cloud
- What is Hyperconverged Infrastructure (HCI)
- Review Lenovo Offerings in Cloud and HCI
- Scenarios

Tags: Cloud

Published: 2023-07-11

Length: 40 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DCLDS104r2

30. **What's New with Nutanix 2.0? Portfolio and Licensing**

2023-06-08 | 15 minutes | Employees and Partners

Nutanix has updated and simplified their licensing for our joint customers. This course is created to give sales and partners representatives an overview for the recent Nutanix licensing changes and their current options.

Course Objectives:

After completing this course, you should be able to:

- Describe the new Nutanix licensing rollout
- List the new pricing and packaging options

Tags: Cloud, Nutanix, Software Defined Infrastructure (SDI), ThinkAgile

Published: 2023-06-08

Length: 15 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Partner link: [Lenovo Partner Learning](#)

Course code: DHXL001

31. **Data Infrastructure Management - DM Series Storage**

2022-10-28 | 25 minutes | Employees Only

This course provides a technical overview of the ThinkSystem DM series products. Course DDMO101 – Lenovo ThinkSystem DM & DE Series Overview is recommended prior to this course.

By the end of this course, you should be able to:

- Recognize the components of the Lenovo Data Management portfolio
- Discuss the features of the Lenovo Data Management components
- Describe the features of the SnapCenter software components

Tags: Sales, Storage, Technical Sales, ThinkSystem

Published: 2022-10-28

Length: 25 minutes

Start the training:

Employee link: [Grow@Lenovo](#)

Course code: DDM200

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>
- 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
<https://support.lenovo.com/us/en/solutions/HT515725>
- Lenovo Data Center Support
<http://datacentersupport.lenovo.com>

Related product families

Product families related to this document are the following:

- [2-Socket Rack Servers](#)
- [Hyperconverged Infrastructure](#)
- [ThinkAgile HX Series for Nutanix](#)

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This document, LP1649, was created or updated on April 8, 2025.

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