

Lenovo ThinkAgile HX7820 Appliance for SAP HANA (Xeon SP Gen 2) Product Guide

Lenovo ThinkAgile HX Series Appliances for SAP HANA are designed to help you simplify IT infrastructure, reduce costs, and accelerate time to value. These hyperconverged appliances from Lenovo combine industry-leading hyperconvergence software from Nutanix with Lenovo enterprise platforms that feature the second generation of the Intel Xeon Processor Scalable Family (Xeon SP Gen 2).

The ThinkAgile HX7820 for SAP HANA is a 4U rack-mount appliance that supports four processors, up to 6 TB of TruDDR4 memory with up to 2933 MHz memory speeds, up to 24 drives for all flash storage capacity with optional NVMe PCIe cache acceleration, and flexible network connectivity options with 1/10 GbE RJ-45, 10 GbE SFP+, 10/25 GbE SFP28, and 25/40 GbE QSFP+ ports.

The ThinkAgile HX7820 Appliance for SAP HANA is certified by SAP for deploying SAP HANA solutions on hyperconverged infrastructure (HCI) in production environments.

The ThinkAgile HX7820 Appliance for SAP HANA is shown in the following figure.

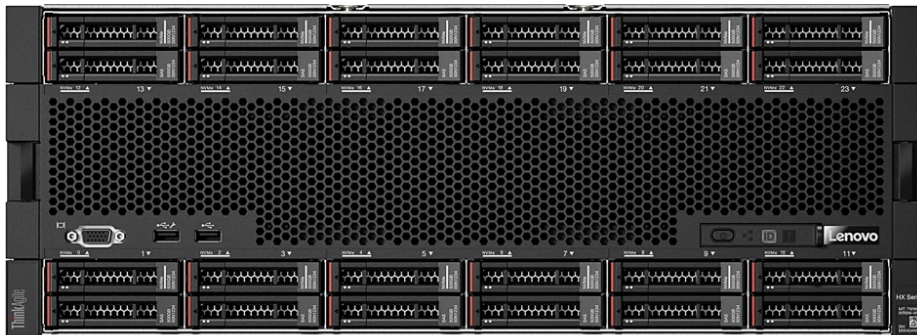


Figure 1. Lenovo ThinkAgile HX7820 Appliance for SAP HANA

Did you know?

The ThinkAgile HX Series appliances are built on industry-leading Lenovo ThinkSystem servers that feature enterprise-class reliability, management, and security.

The ThinkAgile HX Series appliances offer ThinkAgile Advantage Single Point of Support for quick 24/7 problem reporting and resolution.

Key features

The ThinkAgile HX Series Appliances for SAP HANA offer the following key features:

- Certified to run SAP HANA in production on hyperconverged infrastructure.
- Factory-integrated, pre-configured ready-to-go appliances built on proven and reliable Lenovo ThinkSystem servers that provide compute power for SAP HANA workloads 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 workload demands with performance-optimized all-flash storage configurations.
- Deliver fully validated and integrated hardware and firmware that is certified with Nutanix software.
- Include Lenovo ThinkAgile Advantage Single Point of Support for quick 24/7 problem reporting and resolution.
- Offer Lenovo deployment services to get customers up and running quickly.

The Nutanix software running on the HX Series appliances deliver 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.

Components and connectors

The following figure shows the front view of the HX7820 Appliance for SAP HANA.

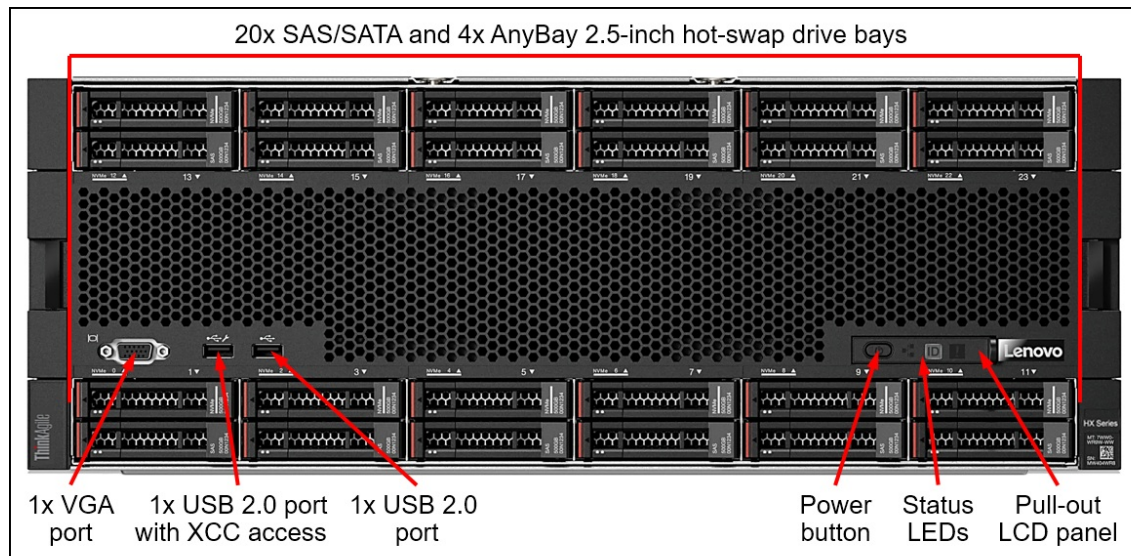


Figure 2. HX7820 for SAP HANA front view

The front of the HX7820 Appliance for SAP HANA includes the following components:

- 16x SAS/SATA and 8x AnyBay SFF hot-swap drive bays
- One VGA port
- One USB 2.0 port with XClarity Controller access
- One USB 2.0 port
- A power button
- Status LEDs
- A Pull-out LCD panel

The following figure shows the rear view of the HX7820 Appliance for SAP HANA.

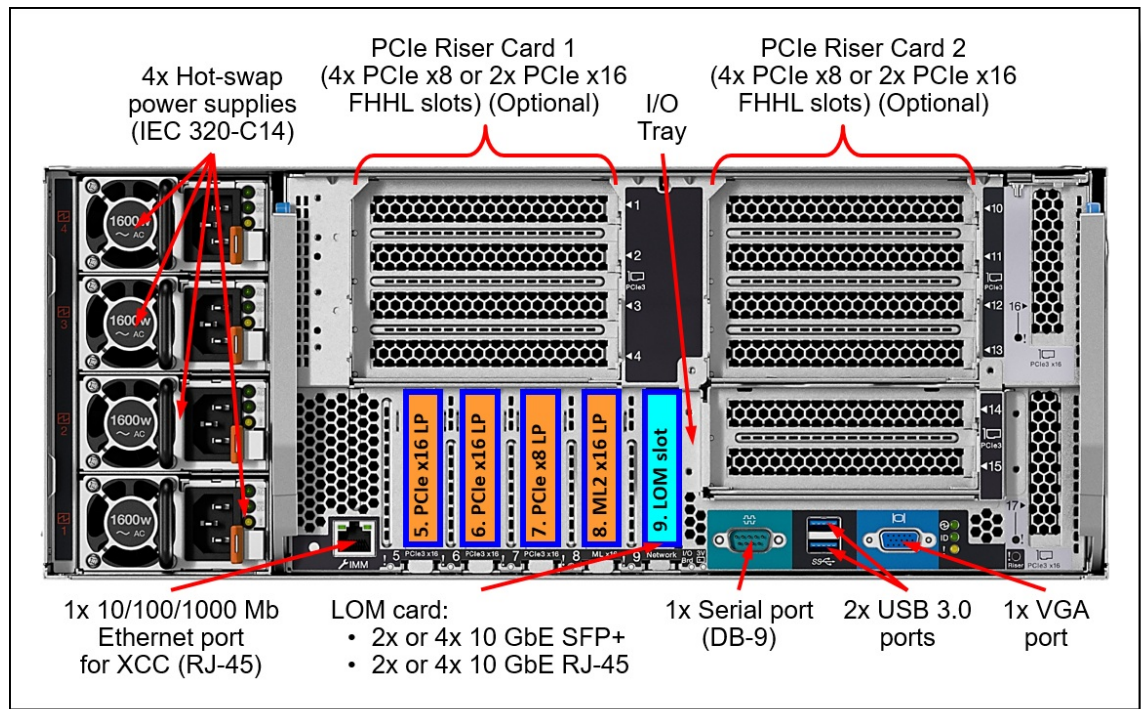


Figure 3. HX7820 for SAP HANA rear view

The rear of the HX7820 Appliance for SAP HANA includes the following components:

- PCIe Riser Card 1 (optional): Up to four PCIe slots
- I/O Tray:
 - Three PCIe slots
 - One ML2 slot
 - One LOM card slot
- PCIe Riser Card 2 (optional): Up to four PCIe slots
- One 1 GbE port for XClarity Controller
- One DB-9 serial port
- Two USB 3.0 ports
- One VGA port
- Four hot-swap power supplies

System specifications

The following table lists the system specifications of the ThinkAgile HX7820 Appliances for SAP HANA.

Table 1. HX7820 for SAP HANA system specifications

Attribute	Specification
Form factor	4U Rack-mount.
Processor	Two or four Intel Xeon Gold or Platinum Gen 2 processors.
Chipset	Intel C624.

Attribute	Specification
Memory	48 DIMM slots for 12, 24, or 48 DIMMs (6 or 12 DIMMs per processor; six memory channels per processor with two DIMMs per channel) with support for the following DIMM types and capacities: <ul style="list-style-type: none"> ● TruDDR4 RDIMMs: <ul style="list-style-type: none"> ○ 16 GB, 32 GB, and 64 GB Performance+ 2933 MHz. ○ 16 GB, 32 GB, and 64 GB 2933 MHz. ○ 16 GB and 32 GB 2666 MHz. ● TruDDR4 3DS RDIMMs: <ul style="list-style-type: none"> ○ 128 GB Performance+ 2933 MHz. ○ 128 GB 2933 MHz. ○ 64 GB 2666 MHz.
Memory capacity	Up to 6 TB.
Memory protection	Error correction code (ECC), Single Device Data Correction (SDDC; for x4-based memory DIMMs), Adaptive Double Device Data Correction (ADDDC; for x4-based memory DIMMs), patrol scrubbing, and demand scrubbing.
Drive bays	16x SAS/SATA and 8x AnyBay SFF hot-swap.
Internal storage	<ul style="list-style-type: none"> ● No cache drives (NVMe PCIe SSDs) and from 8 to 24 capacity drives (SAS or SATA SSDs) in increments of 2 drives; or ● 2 cache drives and from 4 to 6 capacity drives in increments of 2 drives; or ● 4 cache drives and from 8 to 20 capacity drives in increments of 2 drives.
Drive capacities	<ul style="list-style-type: none"> ● Cache drives (NVMe PCIe 3.0 x4 SSDs): 750 GB, 1.6 TB, 3.2 TB. ● Capacity drives: <ul style="list-style-type: none"> ○ 12 Gbps SAS SSDs: 800 GB, 1.6 TB, 3.84 TB, 7.68 TB. ○ 6 Gbps SATA SSDs: 480 GB, 960 GB, 1.92 TB, 3.84 TB. <p>Note: All cache drives in the appliance must be of the same model and capacity. All capacity drives in the appliance must be of the same type and capacity.</p>
Maximum storage capacity	Up to 184 TB (24x 7.68 TB SSDs).
Storage controller	2x 430-16i HBAs (12 Gbps SAS/6 Gbps SATA; non-RAID). Onboard NVMe (non-RAID).
Network interfaces	<ul style="list-style-type: none"> ● 2x or 4x 1/10 GbE RJ-45 or 10 GbE SFP+ base network ports. ● 2x, 4x, 6x, or 8x 10/25 GbE SFP28 or 25/40 GbE QSFP+ additional network ports.
Boot drive	2x M.2 non-hot-swap SSDs up to 480 GB (RAID-1).

Attribute	Specification
I/O expansion slots	Up to 15 I/O expansion slots: <ul style="list-style-type: none"> ● Riser Card 1 (if present): <ul style="list-style-type: none"> ○ PCIe x8 Riser Card: <ul style="list-style-type: none"> ■ Slot 1: PCIe 3.0 x8; full-height, half-length. ■ Slot 2: PCIe 3.0 x8; full-height, half-length. ■ Slot 3: PCIe 3.0 x8; full-height, half-length. ■ Slot 4: PCIe 3.0 x8; full-height, half-length. ○ PCIe x16 Riser Card: <ul style="list-style-type: none"> ■ Slot 3: PCIe 3.0 x16; full-height, half-length. ■ Slot 4: PCIe 3.0 x16; full-height, half-length. ● I/O tray: <ul style="list-style-type: none"> ○ Slot 5: PCIe 3.0 x16; low profile. ○ Slot 6: PCIe 3.0 x16; low profile. ○ Slot 7: PCIe 3.0 x8; low profile. ○ Slot 8: ML2 x16; low profile (not used). ○ Slot 9: LOM Card slot (PCIe 3.0 x8 interface). ● Riser Card 2 (if present): <ul style="list-style-type: none"> ○ PCIe x8 Riser Card: <ul style="list-style-type: none"> ■ Slot 10: PCIe 3.0 x8; full-height, half-length. ■ Slot 11: PCIe 3.0 x8; full-height, half-length. ■ Slot 12: PCIe 3.0 x8; full-height, half-length. ■ Slot 13: PCIe 3.0 x8; full-height, half-length. ○ PCIe x16 Riser Card: <ul style="list-style-type: none"> ■ Slot 12: PCIe 3.0 x16; full-height, half-length. ■ Slot 13: PCIe 3.0 x16; full-height, half-length. ● Compute tray: Internal PCIe 3.0 x8 (for an internal storage controller). ● Storage tray: Internal PCIe 3.0 x8 (for an internal storage controller).
Ports	<ul style="list-style-type: none"> ● Front: 1x USB 2.0 port with XClarity Controller access, 1x USB 2.0 port, 1x VGA port. ● Rear: 2x USB 3.0 ports, 1x VGA port, 1x DB-9 serial port, 1x RJ-45 10/100/1000 Mb Ethernet port for systems management.
Cooling	Six hot-swap fans with N+1 redundancy in the compute tray.
Power supply	Four redundant hot-swap 1600 W (100 - 240 V) High Efficiency power supplies (80 PLUS Platinum certified).
Video	Matrox G200 with 16 MB memory integrated into the XClarity Controller. Maximum resolution is 1920x1200 at 60 Hz with 32 bits per pixel.
Hot-swap parts	SSDs and HDDs, power supplies, and fans.
Systems management	XClarity Controller (XCC) Enterprise (Pilot 4 chip), proactive platform alerts, light path diagnostics, XClarity Provisioning Manager, XClarity Administrator and XClarity Pro. XClarity Energy Manager (optional).
Security features	Power-on password, administrator's password, secure firmware updates, Trusted Platform Module (TPM) 1.2 or 2.0 (configurable UEFI setting).
Software	Nutanix Acropolis: Starter, Pro, and Ultimate editions. Nutanix Prism, Nutanix Calm (optional), Nutanix Flow (optional). SAP HANA (licenses are purchased separately from SAP; deployed at the customer site by Lenovo Professional Services).
Hypervisors	Nutanix Acropolis hypervisor, VMware ESXi
Hardware warranty	Three-, four-, or five-year customer-replaceable unit and onsite limited hardware warranty with ThinkAgile Advantage Support and selectable service levels: 9x5 next business day (NBD) parts delivered, 9x5 NBD onsite response, 24x7 coverage with 2-hour or 4-hour onsite response, or 6-hour or 24-hour committed repair (select areas). Also available are YourDrive YourData, Premier Support, and Enterprise Software Support.
Software maintenance	Three-, four-, or five-year software support and subscription (matches the duration of the selected warranty period).
Dimensions	Height: 173 mm (6.8 in.), width: 447 mm (17.6 in.), depth: 800 mm (31.5 in.)

Attribute	Specification
Weight	Maximum configuration: 58.7 kg (129.4 lb)

Factory-integrated models

Factory-integrated models of the ThinkAgile HX Series appliances 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/>

Note: You are required to engage a Lenovo representative in the project that includes the ThinkAgile HX Series appliances.

The following table lists the base CTO model of the ThinkAgile HX7820 Appliance for SAP HANA.

Table 2. Base CTO model

Description	Machine Type/Model
ThinkAgile HX7820 Appliance for SAP HANA	7Z08CTO1WW

The following table lists the base chassis for the HX7820 appliance.

Table 3. Base chassis

Description	Feature code
ThinkAgile HX782x Base	B4EE

The HX7820 Appliances for SAP HANA ship with the following items:

- *Electronic Publications Flyer*
- Fixed Rail Kit
- Four customer-selected power cables

Processors

The ThinkAgile HX7820 Appliance for SAP HANA ships with four processors. The following table lists the processor options that are available for selection.

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 4. Processor options

Description	Feature code	Quantity
Intel Xeon Gold processors		
Intel Xeon Gold 5215 10C 85W 2.5GHz Processor	B4HN	2 / 4
Intel Xeon Gold 5215L 10C 85W 2.5GHz Processor	B4P9	2 / 4
Intel Xeon Gold 5217 8C 115W 3.0GHz Processor	B4HM	2 / 4
Intel Xeon Gold 5218 16C 125W 2.3GHz Processor	B4HL	2 / 4
Intel Xeon Gold 5220 18C 125W 2.2GHz Processor	B4HK	2 / 4
Intel Xeon Gold 5220S 18C 125W 2.7GHz Processor	B6CW	2 / 4
Intel Xeon Gold 6222V 20C 115W 1.8GHz Processor	B6CV	2 / 4
Intel Xeon Gold 6226 12C 125W 2.7GHz Processor	B6CL	2 / 4
Intel Xeon Gold 6230 20C 125W 2.1GHz Processor	B4HJ	2 / 4
Intel Xeon Gold 6234 8C 130W 3.3GHz Processor	B6CK	2 / 4
Intel Xeon Gold 6238 22C 140W 2.1GHz Processor	B6CJ	2 / 4
Intel Xeon Gold 6238L 22C 140W 2.1GHz Processor	B6CR	2 / 4
Intel Xeon Gold 6240 18C 150W 2.6GHz Processor	B4HH	2 / 4
Intel Xeon Gold 6240L 18C 150W 2.6GHz Processor	B6CS	2 / 4
Intel Xeon Gold 6242 16C 150W 2.8GHz Processor	B4HG	2 / 4
Intel Xeon Gold 6244 8C 150W 3.6GHz Processor	B4HF	2 / 4
Intel Xeon Gold 6246 12C 165W 3.3GHz Processor	B6PD	2 / 4
Intel Xeon Gold 6248 20C 150W 2.5GHz Processor	B4HE	2 / 4
Intel Xeon Gold 6252 24C 150W 2.1GHz Processor	B4HC	2 / 4
Intel Xeon Gold 6252N 24C 150W 2.3GHz Processor	B6CT	2 / 4
Intel Xeon Gold 6254 18C 200W 3.1GHz Processor	B4HD	2 / 4
Intel Xeon Gold 6262V 24C 135W 1.9GHz Processor	B6CU	2 / 4
Intel Xeon Platinum processors		
Intel Xeon Platinum 8253 16C 125W 2.2GHz Processor	B5RZ	2 / 4
Intel Xeon Platinum 8260 24C 165W 2.4GHz Processor	B4HB	2 / 4
Intel Xeon Platinum 8260L 24C 165W 2.4GHz Processor	B4P7	2 / 4
Intel Xeon Platinum 8268 24C 205W 2.9GHz Processor	B4HA	2 / 4
Intel Xeon Platinum 8270 26C 205W 2.7GHz Processor	B4H9	2 / 4
Intel Xeon Platinum 8276 28C 165W 2.2GHz Processor	B4H8	2 / 4
Intel Xeon Platinum 8276L 28C 165W 2.2GHz Processor	B4P6	2 / 4
Intel Xeon Platinum 8280 28C 205W 2.7GHz Processor	B4H7	2 / 4
Intel Xeon Platinum 8280L 28C 205W 2.7GHz Processor	B4P5	2 / 4

It is possible to add two more processors to the models with two processors after the initial deployment by acquiring processor options and additional core capacity license options (see [Software](#) for details).

The following table lists the specifications of the processors for the appliances.

Processor specifications table abbreviations:

- UPI: Ultra Path Interconnect
- TDP: Thermal Design Power
- HT: Hyper-Threading
- TB: Turbo Boost 2.0
- VT-x: Virtualization Technology
- VT-d: Virtualization Technology for Directed I/O
- RAS: Reliability, Availability, and Serviceability
 - Std: Standard RAS
 - Adv: Advanced RAS

Table 5. Processor specifications

CPU model	Cores / threads	Core speed (Base / TB Max)	Cache	Max DDR4 speed	Max memory capacity per socket	UPI links	TDP	HT	TB	VT-x	VT-d	RAS
Intel Xeon Gold processors												
5215	10 / 20	2.5 / 3.4 GHz	13.75 MB	2666 MHz	1 TB	2x 10.4 GT/s	85 W	Y	Y	Y	Y	Adv
5215L	10 / 20	2.5 / 3.4 GHz	13.75 MB	2666 MHz	4.5 TB	2x 10.4 GT/s	85 W	Y	Y	Y	Y	Adv
5217	8 / 16	3.0 / 3.7 GHz	11 MB	2666 MHz	1 TB	2x 10.4 GT/s	115 W	Y	Y	Y	Y	Adv
5218	16 / 32	2.3 / 3.9 GHz	22 MB	2666 MHz	1 TB	2x 10.4 GT/s	125 W	Y	Y	Y	Y	Adv
5220	18 / 36	2.2 / 3.9 GHz	24.75 MB	2666 MHz	1 TB	2x 10.4 GT/s	125 W	Y	Y	Y	Y	Adv
5220S	18 / 36	2.2 / 3.9 GHz	24.75 MB	2666 MHz	1 TB	2x 10.4 GT/s	125 W	Y	Y	Y	Y	Adv
6222V	20 / 40	1.8 / 3.6 GHz	27.5 MB	2933 MHz	1 TB	3x 10.4 GT/s	115 W	Y	Y	Y	Y	Adv
6226	12 / 24	2.7 / 3.7 GHz	19.25 MB	2933 MHz	1 TB	3x 10.4 GT/s	125 W	Y	Y	Y	Y	Adv
6230	20 / 40	2.1 / 3.9 GHz	27.5 MB	2933 MHz	1 TB	3x 10.4 GT/s	125 W	Y	Y	Y	Y	Adv
6234	8 / 16	3.3 / 4.0 GHz	24.75 MB	2933 MHz	1 TB	3x 10.4 GT/s	130 W	Y	Y	Y	Y	Adv
6238	22 / 44	2.1 / 3.7 GHz	30.25 MB	2933 MHz	1 TB	3x 10.4 GT/s	140 W	Y	Y	Y	Y	Adv
6238L	22 / 44	2.1 / 3.7 GHz	30.25 MB	2933 MHz	4.5 TB	3x 10.4 GT/s	140 W	Y	Y	Y	Y	Adv
6240	18 / 36	2.6 / 3.9 GHz	24.75 MB	2933 MHz	1 TB	3x 10.4 GT/s	150 W	Y	Y	Y	Y	Adv
6240L	18 / 36	2.6 / 3.9 GHz	24.75 MB	2933 MHz	4.5 TB	3x 10.4 GT/s	150 W	Y	Y	Y	Y	Adv
6242	16 / 32	2.8 / 3.9 GHz	22 MB	2933 MHz	1 TB	3x 10.4 GT/s	150 W	Y	Y	Y	Y	Adv
6244	8 / 16	3.6 / 4.4 GHz	24.75 MB	2933 MHz	1 TB	3x 10.4 GT/s	150 W	Y	Y	Y	Y	Adv
6246	12 / 24	3.3 / 3.9 GHz	24.75 MB	2933 MHz	1 TB	3x 10.4 GT/s	165 W	Y	Y	Y	Y	Adv
6248	20 / 40	2.5 / 3.9 GHz	27.5 MB	2933 MHz	1 TB	3x 10.4 GT/s	150 W	Y	Y	Y	Y	Adv
6252	24 / 48	2.1 / 3.7 GHz	35.75 MB	2933 MHz	1 TB	3x 10.4 GT/s	150 W	Y	Y	Y	Y	Adv
6252N	24 / 48	2.3 / 3.6 GHz	35.75 MB	2933 MHz	1 TB	3x 10.4 GT/s	150 W	Y	Y	Y	Y	Adv
6254	18 / 36	3.1 / 4.0 GHz	24.75 MB	2933 MHz	1 TB	3x 10.4 GT/s	200 W	Y	Y	Y	Y	Adv
6262V	24 / 48	1.9 / 3.6 GHz	33 MB	2400 MHz	1 TB	3x 10.4 GT/s	135 W	Y	Y	Y	Y	Adv
Intel Xeon Platinum processors												
8253	16 / 32	2.2 / 3 GHz	22 MB	2933 MHz	1 TB	3x 10.4 GT/s	125 W	Y	Y	Y	Y	Adv
8260	24 / 48	2.4 / 3.9 GHz	35.75 MB	2933 MHz	1 TB	3x 10.4 GT/s	165 W	Y	Y	Y	Y	Adv
8260L	24 / 48	2.4 / 3.9 GHz	35.75 MB	2933 MHz	4.5 TB	3x 10.4 GT/s	165 W	Y	Y	Y	Y	Adv
8268	24 / 48	2.9 / 3.9 GHz	35.75 MB	2933 MHz	1 TB	3x 10.4 GT/s	205 W	Y	Y	Y	Y	Adv
8270	26 / 52	2.7 / 4 GHz	35.75 MB	2933 MHz	1 TB	3x 10.4 GT/s	205 W	Y	Y	Y	Y	Adv
8276	28 / 56	2.2 / 4 GHz	38.5 MB	2933 MHz	1 TB	3x 10.4 GT/s	165 W	Y	Y	Y	Y	Adv
8276L	28 / 56	2.2 / 4 GHz	38.5 MB	2933 MHz	4.5 TB	3x 10.4 GT/s	165 W	Y	Y	Y	Y	Adv
8280	28 / 56	2.7 / 4 GHz	38.5 MB	2933 MHz	1 TB	3x 10.4 GT/s	205 W	Y	Y	Y	Y	Adv
8280L	28 / 56	2.7 / 4 GHz	38.5 MB	2933 MHz	4.5 TB	3x 10.4 GT/s	205 W	Y	Y	Y	Y	Adv

Memory

The ThinkAgile HX7820 Appliances for SAP HANA support Lenovo TruDDR4 memory. TruDDR4 memory uses the highest-quality components sourced from Tier 1 DRAM suppliers and only memory that meets strict requirements is selected. It is compatibility tested and tuned to maximize performance and reliability.

The ThinkAgile HX7820 Appliances for SAP HANA support 24 or 48 DIMMs with four processors, or 12 or 24 DIMMs with two processors. Each processor has six memory channels (two integrated memory controllers with three memory channels per memory controller), and there are two DIMMs per channel.

The following rules apply when selecting the memory configuration:

- The appliance supports RDIMMs or 3DS RDIMMs with rated speeds of 2666 MHz or 2933 MHz.
- The following memory capacities are supported by the appliance: 384 GB, 576 GB, 768 GB, 1.125 TB, 1.5 TB, 2.25 TB, 3 TB, 4.5 TB, and 6 TB.
- In the configurations with other than 576 GB, 1.125 TB, 2.25 TB, or 4.5 TB of memory capacity, all DIMMs in the appliance must be of the same type, speed, rank, and capacity (the same part number or feature code).
- In the configurations with 576 GB, 1.125 TB, 2.25 TB, or 4.5 TB of memory capacity, a combination of DIMMs with different capacities is used, and all DIMMs in the appliance must be of the same type and speed.
Note: Mixing DIMMs of different speeds is allowed in the configurations with 2.25 TB or 4.5 TB of memory capacity, as shown in the Memory configurations selection options table.
- All DIMMs in the appliance operate at the same speed, which is determined as the lowest value of:
 - DIMM rated speed (2666 MHz or 2933 MHz).
 - Memory speed supported by the specific processor (2666 MHz or 2933 MHz).
 - Memory speed for the selected quantity of DIMMs per channel:
 - One DIMM per channel (1 DPC): 2933 MHz.
 - Two DIMMs per channel (2 DPC)
 - Performance+ DIMMs: 2933 MHz.
 - Other supported DIMMs: 2666 MHz.
- Appliance configurations with more than 1 TB of memory capacity per socket require processors that support up to 4.5 TB per socket (L-suffix).

The following memory protection technologies are supported:

- ECC
- SDDC (for x4-based memory DIMMs)
- ADDDC (for x4-based memory DIMMs)
- Patrol scrubbing
- Demand scrubbing

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

Table 6. Memory configuration selection options

Description	Part number	Feature code	Quantity									
			384 GB	576 GB	768 GB	1.125 TB†	1.125 TB‡	1.5 TB	2.25 TB	3 TB	4.5 TB‡	6 TB‡
ThinkSystem 2933 MHz Performance+ RDIMMs												
16GB TruDDR4 Perf.+ 2933MHz (2Rx8 1.2V) RDIMM	None*	B5N6	24	12 + 12‡	48‡	-	24 + 24	-	-	-	-	-
32GB TruDDR4 Perf.+ 2933MHz (2Rx4 1.2V) RDIMM	None*	B5N7	12†	12†	24	12 + 12	24	48‡	24 + 24‡	-	-	-
64GB TruDDR4 Perf.+ 2933MHz (2Rx4 1.2V) RDIMM	None*	B5N8	-	-	12†	12	-	24	24‡	48‡	-	-
ThinkSystem 2933 MHz Performance+ 3DS RDIMMs												
128GB TruDDR4 Perf.+ 2933MHz (4Rx4 1.2V) 3DS RDIMM	None*	B5N9	-	-	-	-	-	12†	-	24	-	48
ThinkSystem 2933 MHz RDIMMs												
16GB TruDDR4 2933MHz (2Rx8 1.2V) RDIMM	4ZC7A08708	B4H2	24	12 + 12‡	48‡	-	24 + 24	-	-	-	-	-
32GB TruDDR4 2933MHz (2Rx4 1.2V) RDIMM	4ZC7A08709	B4H3	12†	12†	24	12 + 12	24	48‡	24 + 24‡	-	-	-
64GB TruDDR4 2933MHz (2Rx4 1.2V) RDIMM	4ZC7A08710	B4H4	-	-	12†	12	-	24	24‡	48‡	-	-
ThinkSystem 2933 MHz 3DS RDIMMs												
128GB TruDDR4 2933MHz (4Rx4 1.2V) 3DS RDIMM	4ZC7A15113	B587	-	-	-	-	-	12†	12 + 12†^	24	24 + 24^	48
ThinkSystem 2666 MHz RDIMMs												
16GB TruDDR4 2666 MHz (2Rx8 1.2V) RDIMM	7X77A01303	AUNC	24	12 + 12‡	48‡	-	24 + 24	-	-	-	-	-
32GB TruDDR4 2666 MHz (2Rx4 1.2V) RDIMM	7X77A01304	AUND	12†	12	24	-	24	48‡	-	-	-	-

* Factory-installed only; no field upgrade.

† Available only in the configurations with two processors.

‡ Available only in the configurations with four processors.

^ This memory combination operates at up to 2666 MHz.

It is possible to expand memory capacity after the initial deployment by adding more memory DIMMs to match one of the supported memory configurations.

Internal storage

The ThinkAgile HX7820 Appliance for SAP HANA provides 16x SAS/SATA and 8x AnyBay SFF hot-swap drive bays for configurable storage capacity, and it contains two internal M.2 SATA non-hot-swap SSDs configured in a RAID-1 drive group for software preload.

The following table lists the internal storage options for the HX7820 Appliance for SAP HANA.

Table 7. Internal storage options

Description	Feature code	Quantity
Backplanes		
ThinkSystem 2.5" SAS/SATA 2x2 Bay Backplane Kit	AUN6	2
ThinkSystem 2.5" SAS/SATA/NVMe 2x2 Bay Backplane Kit	AUN5	4
M.2 enablement kit		
ThinkSystem M.2 with Mirroring Enablement Kit	AUMV	1

Configuration notes:

- Two SAS/SATA backplanes, four AnyBay (SAS/SATA/NVMe) backplanes, and one M.2 with Mirroring Enablement Kit are derived by the configurator.
- The M.2 with Mirroring Enablement Kit is connected to the Intel PCH via the PCIe link, and the kit supports two M.2 SATA SSDs configured in a RAID-1 drive group for software preload.
- Two M.2 SATA SSDs are required for selection, and they must be of the same model and capacity.

The following table lists the controllers for internal storage of the HX7820 Appliance for SAP HANA.

Table 8. Controllers for internal storage

Description	Feature code	Quantity
ThinkSystem 430-16i SAS/SATA 12Gb HBA (non-RAID)	AUNM	2

Configuration notes:

- Two low profile SAS HBAs for internal storage provide 12 Gbps SAS JBOD (non-RAID) connectivity to the capacity SDDs; the SAS HBAs derived by the configurator, and they occupy the dedicated PCIe x8 slots on the compute and storage trays.
- The onboard NVMe interfaces provide PCIe 3.0 x4 JBOD (non-RAID) connectivity to the U.2 NVMe PCIe cache SSDs in the AnyBay drive bays.

Drives for internal storage

The following tables list the drive selection options.

Configuration notes:

- Internal storage is defined as follows:
 - Cache tier: NVMe SSD
 - Capacity tier: SAS or SATA SSD
- For All Flash configurations, the HX7820 Appliance for SAP HANA supports from 4 to 24 capacity drives (SAS or SATA SSDs) depending on the quantity of the cache drives (NVMe PCIe SSDs):
 - No cache drives: From 8 to 24 capacity drives in increments of 2 drives.
 - 2 cache drives: From 4 to 6 capacity drives in increments of 2 drives.
 - 4 cache drives: From 8 to 20 capacity drives in increments of 2 drives.
- All cache drives in the appliance must be of the same model and capacity. All capacity drives in the appliance must be of the same model and capacity.

It is possible to expand storage capacity after the initial deployment by adding more drives to match one of the supported storage configurations and acquiring additional storage capacity license options (see [Software](#) for details).

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

2.5-inch hot-swap drives:

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

M.2 drives:

- [M.2 SATA drives](#)

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

Table 9. 2.5-inch hot-swap 12 Gb SAS SSDs

Part number	Feature	Description	Maximum supported
2.5-inch hot-swap SSDs - 12 Gb SAS - Mainstream (3-5 DWPD)			
4XB7A17062	B8HU	ThinkSystem 2.5" PM1645a 800GB Mainstream SAS 12Gb Hot Swap SSD	24
4XB7A17063	B8J4	ThinkSystem 2.5" PM1645a 1.6TB Mainstream SAS 12Gb Hot Swap SSD	24
4XB7A13654	B4A1	ThinkSystem 2.5" PM1645 1.6TB Mainstream SAS 12Gb Hot Swap SSD	24
2.5-inch hot-swap SSDs - 12 Gb SAS - Entry / Capacity (<3 DWPD)			
4XB7A17054	B91C	ThinkSystem 2.5" PM1643a 3.84TB Entry SAS 12Gb Hot Swap SSD	24
4XB7A17055	B91D	ThinkSystem 2.5" PM1643a 7.68TB Entry SAS 12Gb Hot Swap SSD	24
4XB7A13645	B4A7	ThinkSystem 2.5" PM1643 3.84TB Capacity SAS 12Gb Hot Swap SSD	24

Table 10. 2.5-inch hot-swap 6 Gb SATA SSDs

Part number	Feature	Description	Maximum supported
2.5-inch hot-swap SSDs - 6 Gb SATA - Mainstream (3-5 DWPD)			
4XB7A13634	B49M	ThinkSystem 2.5" Intel S4610 480GB Mainstream SATA 6Gb Hot Swap SSD	24
4XB7A13635	B49N	ThinkSystem 2.5" Intel S4610 960GB Mainstream SATA 6Gb Hot Swap SSD	24
4XB7A13636	B49P	ThinkSystem 2.5" Intel S4610 1.92TB Mainstream SATA 6Gb Hot Swap SSD	24
2.5-inch hot-swap SSDs - 6 Gb SATA - Entry (<3 DWPD)			
4XB7A10198	B34L	ThinkSystem 2.5" PM883 1.92TB Entry SATA 6Gb Hot Swap SSD	24
4XB7A10199	B34M	ThinkSystem 2.5" PM883 3.84TB Entry SATA 6Gb Hot Swap SSD	24

Table 11. 2.5-inch hot-swap PCIe 3.0 NVMe SSDs

Part number	Feature	Description	Maximum supported
2.5-inch SSDs - U.2 PCIe 3.0 NVMe - Performance (10+ DWPD)			
7N47A00083	B2ZJ	ThinkSystem U.2 Intel Optane P4800X 750GB Performance NVMe PCIe 3.0 x4 Hot Swap SSD	4
2.5-inch SSDs - U.2 PCIe 3.0 NVMe - Mainstream (3-5 DWPD)			
4XB7A13937	B58A	ThinkSystem U.2 Intel P4610 3.2TB Mainstream NVMe PCIe3.0 x4 Hot Swap SSD	4
4XB7A08517	B21X	ThinkSystem U.2 Toshiba CM5-V 1.6TB Mainstream NVMe PCIe 3.0 x4 Hot Swap SSD	4

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

Table 12. M.2 SATA drives

Part number	Feature	Description	Maximum supported
M.2 SSDs - 6 Gb SATA - Entry (<3 DWPD)			
7N47A00130	AUUV	ThinkSystem M.2 128GB SATA 6Gbps Non-Hot Swap SSD	2
7SD7A05703	B11V	ThinkSystem M.2 5100 480GB SATA 6Gbps Non-Hot Swap SSD	2
4XB7A17071	B8HS	ThinkSystem M.2 5300 240GB SATA 6Gbps Non-Hot Swap SSD	2
4XB7A17073	B919	ThinkSystem M.2 5300 480GB SATA 6Gbps Non-Hot Swap SSD	2

I/O expansion

The ThinkAgile HX7820 Appliances for SAP HANA support one LOM card slot and up to 14 I/O expansion slots: Three PCIe slots and one ML2 slot in the I/O tray, one PCIe slot in the Compute tray, one PCIe slot in the Storage tray, and up to eight PCIe slots with up to two riser cards.

The slot form factors are as follows:

- Riser Card 1 (if present):
 - PCIe x8 Riser Card:
 - Slot 1: PCIe 3.0 x8; full-height, half-length.
 - Slot 2: PCIe 3.0 x8; full-height, half-length.
 - Slot 3: PCIe 3.0 x8; full-height, half-length.
 - Slot 4: PCIe 3.0 x8; full-height, half-length.
 - PCIe x16 Riser Card:
 - Slot 3: PCIe 3.0 x16; full-height, half-length.
 - Slot 4: PCIe 3.0 x16; full-height, half-length.
- I/O tray:
 - Slot 5: PCIe 3.0 x16; low profile.
 - Slot 6: PCIe 3.0 x16; low profile.
 - Slot 7: PCIe 3.0 x8; low profile.
 - Slot 8: ML2 x16; low profile (not used).
 - Slot 9: LOM Card slot (PCIe 3.0 x8 interface).
- Riser Card 2 (if present):
 - PCIe x8 Riser Card:
 - Slot 10: PCIe 3.0 x8; full-height, half-length.
 - Slot 11: PCIe 3.0 x8; full-height, half-length.
 - Slot 12: PCIe 3.0 x8; full-height, half-length.
 - Slot 13: PCIe 3.0 x8; full-height, half-length.
 - PCIe x16 Riser Card:
 - Slot 12: PCIe 3.0 x16; full-height, half-length.
 - Slot 13: PCIe 3.0 x16; full-height, half-length.
- Compute tray: Internal PCIe 3.0 x8 (for an internal storage controller).
- Storage tray: Internal PCIe 3.0 x8 (for an internal storage controller).

Riser 1 supplies slots 1-4, and Riser 2 supplies slots 10-13. The slots that are available for use depend on the number of riser cards that are installed, as shown in the following table.

Table 13. Slots available for use

Riser Card 1	Riser Card 2	Slots available for use			
		Processor 1	Processor 2	Processor 3	Processor 4
None	None	LOM, 7, 8*	5, 6	-	-
None	PCIe x8	LOM, 7, 8*	5, 6	10, 11, 12, 13	-
None	PCIe x16	LOM, 7, 8*	5, 6	12, 13	-
PCIe x8	None	LOM, 7, 8*	5, 6	-	1, 2, 3, 4
PCIe x8	PCIe x8	LOM, 7, 8*	5, 6	10, 11, 12, 13	1, 2, 3, 4
PCIe x8	PCIe x16	LOM, 7, 8*	5, 6	12, 13	1, 2, 3, 4
PCIe x16	None	LOM, 7, 8*	5, 6	-	3, 4
PCIe x16	PCIe x8	LOM, 7, 8*	5, 6	10, 11, 12, 13	3, 4
PCIe x16	PCIe x16	LOM, 7, 8*	5, 6	12, 13	3, 4

* Slot 8 is an ML2 slot (not available for PCIe adapter installation).

The following table lists available PCIe riser card options.

Table 14. PCIe riser cards

Description	Part number	Feature code	Quantity (min / max)
ThinkSystem SR950 (2) x16 PCIe Riser	7XC7A03961	AUN1	0 / 2
ThinkSystem SR950 (4) x8 PCIe Riser	7XC7A03962	AUN2	0 / 2

Network connectivity

The ThinkAgile HX7820 Appliances for SAP HANA provide two- or four-port 1/10 GbE RJ-45 or 10 GbE SFP+ network connectivity with the onboard Intel X722 NIC and a LOM card installed in the appliance. Two, four, six, or eight additional 10/25 GbE SFP28 or 25/40 GbE QSFP+ ports can be selected, if required.

The following table lists the network adapters.

Table 15. Network adapters

Description	Part number	Feature code	Quantity (min / max)
1/10 GbE RJ-45 ports			
ThinkSystem 10Gb 2-port Base-T LOM (RJ-45)	7ZT7A00548	AUKL	0 / 1
ThinkSystem 10Gb 4-port Base-T LOM (RJ-45)	7ZT7A00549	AUKM	0 / 1
10 GbE SFP+ ports			
ThinkSystem 10Gb 2-port SFP+ LOM	7ZT7A00546	AUKJ	0 / 1
ThinkSystem 10Gb 4-port SFP+ LOM	7ZT7A00547	AUKK	0 / 1
10/25 GbE SFP28 ports			
Mellanox ConnectX-4 Lx 10/25GbE SFP28 2-Port PCIe Ethernet Adapter	01GR250	AUAJ	0 / 4
25/40 GbE QSFP+ ports			
Mellanox ConnectX-5 Ex 25/40GbE 2-port Low-Latency Adapter	4XC7A08229	B31C	0 / 4 [^]

[^] For 25 GbE connectivity, the ConnectX-5 adapter requires the optional Mellanox QSA 100G to 25G Cable Adapters (4G17A10853) (one per port); the supported cables include 25 GbE passive DAC and active optical cables (25 GbE transceivers not supported) (see [Transceivers and cables for 25 GbE SFP28 ports](#) for details).

Configuration notes:

- One of the 1/10 GbE RJ-45 or 10 GbE SFP+ LOM cards is required for selection. Additional ports can be selected, if needed.
- The 10 GbE and 25 GbE PCIe network adapters are supported in the full-high and low-profile PCIe x8 and x16 slots supplied by the I/O Tray and Riser Cards 1 and 2.
- ThinkSystem Mellanox ConnectX-4 is the only adapter enabled for RDMA, minimum required quantity is two
- The 40 GbE PCIe network adapters are supported in the full-high and low-profile PCIe x16 slots supplied by the I/O Tray and Riser Cards 1 and 2.
- Supported transceivers or DAC cables should be purchased for the SFP+, SFP28, and QSFP+ ports, and UTP Category 6 cables should be purchased for the 10 GbE RJ-45 ports. The maximum number of transceivers or cables that are supported per adapter equals the quantity of the adapter ports, and all adapter ports must have the same type of the transceiver or cable selected.

The following transceivers and cables can be purchased:

- [UTP cables for 10 GbE RJ-45 ports](#)
- [Transceivers and cables for 10 GbE SFP+ ports](#)
- [Transceivers and cables for 25 GbE SFP28 ports](#)
- [Transceivers and cables for 40 GbE QSFP+ ports](#)

The following table lists cables for the 10 GbE RJ-45 ports.

Table 16. Cables for 10 GbE RJ-45 ports

Description	Part number	Feature code
UTP Category 6 cables (Green) for 10 GbE RJ-45 ports		
0.75m Cat6 Green Cable	00WE123	AVFW
1.0m Cat6 Green Cable	00WE127	AVFX
1.25m Cat6 Green Cable	00WE131	AVFY
1.5m Cat6 Green Cable	00WE135	AVFZ
3m Cat6 Green Cable	00WE139	AVG0
10m Cat6 Green Cable	90Y3718	A1MT
25m Cat6 Green Cable	90Y3727	A1MW

The following table lists transceivers and cables for the 10 GbE SFP+ ports.

Table 17. Transceivers and cables for 10 GbE SFP+ ports

Description	Part number	Feature code
10 GbE SFP+ SR transceivers for 10 GbE SFP+ ports		
Lenovo 10GBASE-SR SFP+ Transceiver	46C3447	5053
Lenovo 10GBASE-LR SFP+ Transceiver	00FE331	B0RJ
Optical cables for 10 GbE SFP+ SR transceivers		
Lenovo 0.5m LC-LC OM3 MMF Cable	00MN499	ASR5
Lenovo 1m LC-LC OM3 MMF Cable	00MN502	ASR6
Lenovo 3m LC-LC OM3 MMF Cable	00MN505	ASR7
Lenovo 5m LC-LC OM3 MMF Cable	00MN508	ASR8
Lenovo 10m LC-LC OM3 MMF Cable	00MN511	ASR9
Lenovo 15m LC-LC OM3 MMF Cable	00MN514	ASRA
Lenovo 25m LC-LC OM3 MMF Cable	00MN517	ASRB
Lenovo 30m LC-LC OM3 MMF Cable	00MN520	ASRC
Passive SFP+ DAC cables for 10 GbE SFP+ ports		
Lenovo 0.5m Passive SFP+ DAC Cable	00D6288	A3RG
Lenovo 1m Passive SFP+ DAC Cable	90Y9427	A1PH
Lenovo 1.5m Passive SFP+ DAC Cable	00AY764	A51N
Lenovo 2m Passive SFP+ DAC Cable	00AY765	A51P
Lenovo 3m Passive SFP+ DAC Cable	90Y9430	A1PJ
Lenovo 5m Passive SFP+ DAC Cable	90Y9433	A1PK
Lenovo 7m Passive SFP+ DAC Cable	00D6151	A3RH
Active SFP+ DAC cables for 10 GbE SFP+ ports		
Lenovo 1m Active DAC SFP+ Cable	00VX111	AT2R
Lenovo 3m Active DAC SFP+ Cable	00VX114	AT2S
Lenovo 5m Active DAC SFP+ Cable	00VX117	AT2T
SFP+ active optical cables for 10 GbE SFP+ ports		
Lenovo 1m SFP+ to SFP+ Active Optical Cable	00YL634	ATYX

Description	Part number	Feature code
Lenovo 3m SFP+ to SFP+ Active Optical Cable	00YL637	ATYY
Lenovo 5m SFP+ to SFP+ Active Optical Cable	00YL640	ATYZ
Lenovo 7m SFP+ to SFP+ Active Optical Cable	00YL643	ATZ0
Lenovo 15m SFP+ to SFP+ Active Optical Cable	00YL646	ATZ1
Lenovo 20m SFP+ to SFP+ Active Optical Cable	00YL649	ATZ2

The following table lists transceivers and cables for the 25 GbE SFP28 ports.

Table 18. Transceivers and cables for 25 GbE SFP28 ports

Description	Part number	Feature code
25 GbE SFP28 SR transceivers for 25 GbE SFP28 ports		
Lenovo 25GBase-SR SFP28 Transceiver	7G17A03537	AV1B
Optical cables for 25 GbE SFP28 SR transceivers		
Lenovo 0.5m LC-LC OM3 MMF Cable	00MN499	ASR5
Lenovo 1m LC-LC OM3 MMF Cable	00MN502	ASR6
Lenovo 3m LC-LC OM3 MMF Cable	00MN505	ASR7
Lenovo 5m LC-LC OM3 MMF Cable	00MN508	ASR8
Lenovo 10m LC-LC OM3 MMF Cable	00MN511	ASR9
Lenovo 15m LC-LC OM3 MMF Cable	00MN514	ASRA
Lenovo 25m LC-LC OM3 MMF Cable	00MN517	ASRB
Lenovo 30m LC-LC OM3 MMF Cable	00MN520	ASRC
Passive copper cables for 25 GbE SFP28 ports		
Lenovo 1m Passive 25G SFP28 DAC Cable	7Z57A03557	AV1W
Lenovo 3m Passive 25G SFP28 DAC Cable	7Z57A03558	AV1X
Lenovo 5m Passive 25G SFP28 DAC Cable	7Z57A03559	AV1Y
Active optical cables for 25 GbE SFP28 ports		
Lenovo 3m 25G SFP28 Active Optical Cable	7Z57A03541	AV1F
Lenovo 5m 25G SFP28 Active Optical Cable	7Z57A03542	AV1G
Lenovo 10m 25G SFP28 Active Optical Cable	7Z57A03543	AV1H
Lenovo 15m 25G SFP28 Active Optical Cable	7Z57A03544	AV1J
Lenovo 20m 25G SFP28 Active Optical Cable	7Z57A03545	AV1K

The following table lists transceivers and cables for the 40 GbE QSFP+ ports.

Table 19. Transceivers and cables for 40 GbE QSFP+ ports

Description	Part number	Feature code
Optical transceivers for 40 GbE QSFP+ ports		
Lenovo 40GBASE-SR4 QSFP+ Transceiver	49Y7884	A1DR
Optical cables for 40 GbE QSFP+ SR4 transceivers		
Lenovo 10m QSFP+ MPO-MPO OM3 MMF Cable	00VX003	AT2U
Lenovo 30m QSFP+ MPO-MPO OM3 MMF Cable	00VX005	AT2V
Passive DAC cables for 40 GbE QSFP+ ports		
Lenovo 1m Passive QSFP+ DAC Cable	49Y7890	A1DP
Lenovo 3m Passive QSFP+ DAC Cable	49Y7891	A1DQ
Lenovo 5m Passive QSFP+ DAC Cable	00D5810	A2X8
Lenovo 7m Passive QSFP+ DAC Cable	00D5813	A2X9
Active optical cables for 40 GbE QSFP+ ports		
Lenovo 1m QSFP+ to QSFP+ Active Optical Cable	7Z57A04256	AX42
Lenovo 3m QSFP+ to QSFP+ Active Optical Cable	00YL652	ATZ3
Lenovo 5m QSFP+ to QSFP+ Active Optical Cable	00YL655	ATZ4
Lenovo 7m QSFP+ to QSFP+ Active Optical Cable	00YL658	ATZ5
Lenovo 15m QSFP+ to QSFP+ Active Optical Cable	00YL661	ATZ6
Lenovo 20m QSFP+ to QSFP+ Active Optical Cable	00YL664	ATZ7
25 GbE SFP28 cable adapter for 40 GbE QSFP+ ports		
Mellanox 100G QSFP28 to 25G SFP28 Cable Adapter	4G17A10853	B306

Power supplies and cables

The ThinkAgile HX7820 Appliances for SAP HANA ship with four 1600 W (230V) High Efficiency hot-swap power supplies listed in the following table.

Table 20. Power supplies

Description	Feature code	Quantity
High Efficiency 1600W Power Supply for SR950 (200-240VAC only)	AUPJ	4

The ThinkAgile HX7820 Appliances for SAP HANA ship with four customer-configured power cords. The following table lists the rack power cables and line cords that can be ordered for the HX7820 Appliances for SAP HANA.

Table 21. Power cables

Description	Part number	Feature code
Rack power cables		
1.0m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	00Y3043	A4VP
1.0m, 13A/100-250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08367	B0N5
1.5m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	39Y7937	6201
1.5m, 13A/100-250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08368	B0N6

Description	Part number	Feature code
2.0m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08365	B0N4
2.0m, 13A/100-250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08369	6570
2.8m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08366	6311
2.8m, 13A/100-250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08370	6400
2.8m, 10A/100-250V, C13 to IEC 320-C20 Rack Power Cable	39Y7938	6204
4.3m, 10A/100-250V, C13 to IEC 320-C14 Rack Power Cable	39Y7932	6263
4.3m, 13A/100-250V, C13 to IEC 320-C14 Rack Power Cable	4L67A08371	6583
Line cords		
Argentina 2.8m, 10A/250V, C13 to IRAM 2073 Line Cord	39Y7930	6222
Argentina 4.3m, 10A/250V, C13 to IRAM 2073 Line Cord	81Y2384	6492
Australia/New Zealand 2.8m, 10A/250V, C13 to AS/NZS 3112 Line Cord	39Y7924	6211
Australia/New Zealand 4.3m, 10A/250V, C13 to AS/NZS 3112 Line Cord	81Y2383	6574
Brazil 2.8m, 10A/250V, C13 to NBR 14136 Line Cord	69Y1988	6532
Brazil 4.3m, 10A/250V, C13 to NBR14136 Line Cord	81Y2387	6404
China 2.8m, 10A/250V, C13 to GB 2099.1 Line Cord	39Y7928	6210
China 4.3m, 10A/250V, C13 to GB 2099.1 Line Cord	81Y2378	6580
Denmark 2.8m, 10A/250V, C13 to DK2-5a Line Cord	39Y7918	6213
Denmark 4.3m, 10A/250V, C13 to DK2-5a Line Cord	81Y2382	6575
Europe 2.8m, 10A/250V, C13 to CEE7-VII Line Cord	39Y7917	6212
Europe 4.3m, 10A/250V, C13 to CEE7-VII Line Cord	81Y2376	6572
India 2.8m, 10A/250V, C13 to IS 6538 Line Cord	39Y7927	6269
India 4.3m, 10A/250V, C13 to IS 6538 Line Cord	81Y2386	6567
Israel 2.8m, 10A/250V, C13 to SI 32 Line Cord	39Y7920	6218
Israel 4.3m, 10A/250V, C13 to SI 32 Line Cord	81Y2381	6579
Italy 2.8m, 10A/250V, C13 to CEI 23-16 Line Cord	39Y7921	6217
Italy 4.3m, 10A/250V, C13 to CEI 23-16 Line Cord	81Y2380	6493
Japan 2.8m, 12A/250V, C13 to JIS C-8303 Line Cord	4L67A08357	6533
Japan 4.3m, 12A/250V, C13 to JIS C-8303 Line Cord	4L67A08362	6495
Korea 2.8m, 12A/250V, C13 to KS C8305 Line Cord	39Y7925	6219
Korea 4.3m, 12A/250V, C13 to KS C8305 Line Cord	81Y2385	6494
South Africa 2.8m, 10A/250V, C13 to SABS 164 Line Cord	39Y7922	6214
South Africa 4.3m, 10A/250V, C13 to SABS 164 Line Cord	81Y2379	6576
Switzerland 2.8m, 10A/250V, C13 to SEV 1011-S24507 Line Cord	39Y7919	6216
Switzerland 4.3m, 10A/250V, C13 to SEV 1011-S24507 Line Cord	81Y2390	6578
Taiwan 2.8m, 10A/250V, C13 to CNS 10917-3 Line Cord	81Y2375	6317
Taiwan 4.3m, 10A/250V, C13 to CNS 10917-3 Line Cord	81Y2389	6531
United Kingdom 2.8m, 10A/250V, C13 to BS 1363/A Line Cord	39Y7923	6215
United Kingdom 4.3m, 10A/250V, C13 to BS 1363/A Line Cord	81Y2377	6577
United States 2.8m, 10A/250V, C13 to NEMA 6-15P Line Cord	46M2592	A1RF
United States 4.3m, 10A/250V, C13 to NEMA 6-15P Line Cord	4L67A08361	6373

Rack installation

The HX7820 Appliances for SAP HANA ship with the rail kit shown in the following table.

Table 22. Rail kit

Description	Feature code	Quantity
Rail Kit (screw-in, fixed)	A4AA	1

The following table summarizes the rail kit features and specifications.

Table 23. Rail kit features and specifications summary

Feature	Screw-in Fixed Rail
CMA	None
Rail type	Fixed
Rail length (supporting flange)	545.1 mm (21.46 in.)
Tool-less installation	No
In-rack maintenance	No*
1U PDU support	Yes
0U PDU support	Limited**
Rack type	IBM and Lenovo 4-post, IEC standard-compliant
Mounting holes	Square or round
Mounting flange thickness	2 mm (0.08 in.) – 3.3 mm (0.13 in.)
Distance between front and rear mounting flanges [^]	711.2 mm (28 in.) – 914.4 mm (36 in.)

* While certain servicing tasks require the appliance to be removed from the rack cabinet, the majority of appliance components can be serviced from the front or rear of the appliance, which does not require the removal of the appliance from the rack cabinet.

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

[^] Measured when mounted on the rack, from the front surface of the front mounting flange to the rear most point of the rail.

Software

The ThinkAgile HX Series for SAP HANA appliances support the following software components:

- [Hypervisor](#)
- [Nutanix Acropolis](#)
- [Nutanix Prism](#)
- [Nutanix Calm \(optional\)](#)
- [Nutanix Flow \(optional\)](#)
- [SAP HANA](#)

Note: 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>

Hypervisor

The ThinkAgile HX7820 for SAP HANA supports the Nutanix AHV hypervisor (Bundled with AOS) that is factory-preinstalled on the 2x M.2 SSDs configured in a RAID-1 drive group. The following table lists the hypervisor available for selection.

Table 24. Hypervisor

Feature code	Description	Quantity
B15S	Nutanix SW Stack on Nutanix AHV	1
BFT7	Nutanix SW Stack on VMware ESXi 6.7	1

Nutanix Acropolis

The ThinkAgile HX7820 Appliances for SAP HANA can be configured with one of the Nutanix software editions that are listed in the following table. The Nutanix software is factory-preloaded and the appropriate license can be downloaded from the Nutanix website to match the serial number of the appliance.

Configuration note: The HX7820 Appliances for SAP HANA (Xeon SP Gen 2) can be deployed as a cluster of 3 or more nodes (AOS 5.11 or later).

Table 25. Nutanix software options

Description	Feature code	Quantity
Nutanix Starter Edition	B0VU	1
Nutanix Pro Edition	B0VV	1
Nutanix Ultimate Edition	B0VW	1

The Starter edition offers the core set of Nutanix software functionality. This edition is ideal for small-scale deployments with a limited set of workloads.

The Pro edition offers rich data services, along with resilience and management features. This edition is ideal for enterprises running multiple applications on a Nutanix cluster or with large-scale single workload deployments.

The Ultimate edition offers the full suite of Nutanix software capabilities to tackle complex infrastructure challenges. This edition is ideal for multi-site deployments.

The following table compares features of the Nutanix software editions.

Table 26. Nutanix software editions feature comparison

Feature	Nutanix software edition		
	Starter	Pro	Ultimate
Enterprise storage			
Cluster size	12 nodes max	Unlimited	Unlimited
Heterogeneous clusters	Yes	Yes	Yes
Online cluster grow/shrink	Yes	Yes	Yes
Storage containers	Yes	Yes	Yes
VM-centric snapshots and clones	Yes	Yes	Yes
Data tiering	Yes	Yes	Yes
Inline compression	Yes	Yes	Yes
Inline performance (cache) deduplication	Yes	Yes	Yes
Post-process compression	No	Yes	Yes
Post-process capacity deduplication	No	Yes	Yes
Erasur Coding (EC-X)	No	Yes	Yes
Nutanix Volumes	No	Yes	Yes
VM Flash Mode (Pin to SSD)	No	No	Yes
Nutanix Files	Optional*	Optional*	Optional*
Infrastructure resilience			
Data path redundancy	Yes	Yes	Yes
Redundancy factor	2 (Fixed)	2 or 3 (Tunable)	2 or 3 (Tunable)
Availability domains	No	Yes	Yes
Data protection			
Asynchronous replication and disaster recovery (DR)	Yes	Yes	Yes
Application-consistent snapshots	Yes	Yes	Yes
Local snapshots	Yes	Yes	Yes
Cloud Connect (Backup to public clouds)	No	Yes	Yes
Self-service restore	No	Yes	Yes
Multiple site DR (many to many)	No	Optional*	Yes
Metro availability	No	Optional*	Yes
Synchronous replication and disaster recovery	No	Optional*	Yes
Security			
Client authentication	Yes	Yes	Yes
Cluster lockdown	No	Yes	Yes
Data-at-rest encryption	No	Optional*^	Yes^
Management and analytics			
Prism Starter (Single- and multi-cluster management)	Yes	Yes	Yes
Pulse (Automated service agent)	Yes	Yes	Yes
Cluster health	Yes	Yes	Yes
One-click upgrades (Nutanix OS and Hypervisor)	Yes	Yes	Yes
Rest APIs	Yes	Yes	Yes
Virtualization			
Built-in Acropolis Hypervisor (AHV)	Yes	Yes	Yes

Feature	Nutanix software edition		
	Starter	Pro	Ultimate
VMware vSphere (ESXi)	Yes	Yes	Yes
VM management	Yes	Yes	Yes
Intelligent VM placement	Yes	Yes	Yes
Virtual network configuration	Yes	Yes	Yes
Host profiles	Yes	Yes	Yes
VM high availability	Yes	Yes	Yes
Self-service portal	Yes	Yes	Yes

* Requires a separate license.

^ Software-based encryption that uses standard drives.

It is possible to upgrade a software edition after the initial deployment by purchasing one of the software upgrade options listed in the following table.

Table 27. Nutanix software upgrade options

Description	Part number	Feature code	Quantity (per node)
Nutanix Starter to Pro Upgrade	01GU985	AW7H	1
Nutanix Starter to Ultimate Upgrade	01GU986	AW7J	1
Nutanix Pro to Ultimate Upgrade	01GU987	AW7K	1

Configuration note: Customers should request a quote for the selected Nutanix SW Upgrade part number from Lenovo and provide additional details on the existing installation and planned upgrade.

In addition to the software licenses for the specific Nutanix software edition, the ThinkAgile HX Series appliances require the Nutanix capacity licenses that are based on the total number of the processor cores and total flash storage (SSD) capacity in the appliance.

During the initial purchase, the Nutanix capacity licenses are derived by the configurator that automatically adds the required quantity of the capacity license options that are listed in the following table based on the selected processors and SSDs.

Table 28. Nutanix capacity license options

Description	Feature code	Quantity
Node Cores	B6C1	1 per processor core
Node Tebibytes	B6C2	1 per TiB of SSD capacity

It is possible to add two more processors to the models with two processors after the initial deployment by acquiring processor options and additional core capacity license options listed in the following table, as needed.

Table 29. Optional core capacity expansion license options

Description	Part number	Feature code	Quantity (per processor core)
Nutanix APOS HW Upgrade for previously sold HX node: Additional Core	7S0P0001WW	S1NL	1

It is possible to expand storage capacity after the initial deployment by adding more drives to match one of the supported storage configurations and acquiring additional SSD capacity license options listed in the following table, as needed.

Table 30. Optional storage capacity expansion license options

Description	Part number	Feature code	Quantity (per TiB of SSD capacity)
Nutanix APOS HW Upgrade for previously sold HX node: Additional TiB	7S0P0002WW	S1NM	1

Configuration notes:

- The total flash storage capacity in Tebibytes (TiB) can be calculated by multiplying the total flash storage capacity in Terabytes (TB) by 0.909495.
- When expanding capacity after the initial deployment, customers should request a quote for the selected HW Upgrade part numbers from Lenovo and provide additional details on the existing installation.

The following optional software licenses are available for the Nutanix software editions:

- Nutanix Files
- Nutanix Software Encryption
- Nutanix Advanced Replication

The optional software licenses can be added during the initial purchase by selecting one of the software options listed in the following table.

Table 31. Optional software selection options

Description	Feature code	Quantity
Nutanix Files	B4MX	1 per TiB of NAS capacity
Nutanix ENC - Data at Rest Encryption	B4V5	1 per node
Nutanix REP - Advanced Replication	B4V6	1 per node

Also, the optional software licenses for Nutanix Files can be added after the initial deployment by purchasing one of the software license options listed in the following table.

Table 32. Optional software license options for Nutanix Files

Description	Part number	Feature code	Quantity (per TiB of NAS capacity)
Nutanix Files License with 1Yr Maintenance and Support (per TiB)	7S0P000JWW	S1P3	1
Nutanix Files License with 2Yr Maintenance and Support (per TiB)	7S0P000KWW	S1P5	1
Nutanix Files License with 3Yr Maintenance and Support (per TiB)	7S0P000LWW	S1MQ	1
Nutanix Files License with 4Yr Maintenance and Support (per TiB)	7S0P000MWW	S1MX	1
Nutanix Files License with 5Yr Maintenance and Support (per TiB)	7S0P000NWW	S1N4	1

Configuration notes:

- The Nutanix Files license is available as an add-on for the Nutanix Starter, Pro, and Ultimate software editions.
- When adding Nutanix Files after the initial deployment, customers should request a quote for the selected Nutanix Files license part numbers from Lenovo and provide additional details on the existing installation.
- The total NAS storage capacity in Tebibytes (TiB) can be calculated by multiplying the total NAS storage capacity in Terabytes (TB) by 0.909495.
- The Nutanix ENC and Nutanix REP licenses are available as add-ons for the Nutanix Pro software edition.
- The Nutanix REP license includes the multiple site DR, metro availability, and synchronous replication and disaster recovery features.

Nutanix Prism

Nutanix Prism gives administrators an easy way to manage virtual environments running on Acropolis, and it simplifies and streamlines common workflows for hypervisor and virtual machine lifecycle management.

Nutanix Prism is a part of the Nutanix software preloaded on the appliances, and it includes the following components:

- Prism Starter (included in Starter, Pro, and Ultimate Nutanix software editions): Provides ability to configure, manage, and monitor a Nutanix cluster and centralized management of multiple local and remote Nutanix clusters.
- Prism Pro (Selectable software license; optional): Enables efficiency evaluation, capacity planning, expansion recommendations, custom dashboards, and advanced search capabilities.

The Prism Pro software license can be added during the initial purchase by selecting one of the software options listed in the following table.

Table 33. Prism Pro selection options

Description	Feature code	Quantity (per node)
Prism Pro	B0W4	1
XClarity Pro and Prism Pro	B0W5	1

Also, Prism Starter can be upgraded to Prism Pro after the initial deployment by purchasing one of the software license options listed in the following table.

Table 34. Prism Pro software license options

Description	Part number	Feature code	Quantity (per node)
Nutanix Prism Pro with 1Yr Support	7S0P000UWW	AW87	1
Nutanix Prism Pro with 2Yr Support	7S0P000VWW	AW88	1
Nutanix Prism Pro with 3Yr Support	7S0P000WWW	AW89	1
Nutanix Prism Pro with 4Yr Support	7S0P000XWW	AW8A	1
Nutanix Prism Pro with 5Yr Support	7S0P000YWW	AW8B	1

Configuration note: When upgrading Prism Starter to Prism Pro after the initial deployment, customers should request a quote for the selected Prism Pro part numbers from Lenovo and provide additional details on the existing installation.

Nutanix Prism offers the following features:

- Single point of control
 - Accelerates enterprise-wide deployment
 - Manages capacity centrally
 - Adds nodes in minutes
 - Supports non-disruptive software upgrades with zero downtime
 - Integrates with REST APIs and PowerShell
 - Manages firmware updates with the ThinkAgile HX Lifecycle Manager (UEFI, XCC, drives, network adapters, and SAS HBAs)
- Monitoring and alerting
 - Tracks infrastructure utilization (storage, processor, memory)
 - Centrally monitors multiple clusters across multiple sites
 - Monitors per-VM performance and resource usage
 - Checks system health
 - Generates alerts and notifications
- Integrated data protection
 - Offers customizable RPO/RTO and retention policies
 - Supports configurable per-VM replication (1:1, 1:many and many:1)
 - Provides efficient VM recovery
 - Deploys affordable DR and backup to the cloud
- Diagnostics and troubleshooting
 - Provides time-based historical views of VM activity
 - Performs proactive alert analysis
 - Correlates alerts and events to quickly diagnose issues
 - Generates actionable alerts and reduces resolution times
 - Analyzes trending patterns for accurate capacity planning

Nutanix Calm

Nutanix Calm enables advanced application-level orchestration by providing a powerful, common management framework that can be leveraged by IT teams to rapidly create and deliver applications. The Calm software offers the following key features:

- Fully automates the provisioning, scaling, and deletion of traditional multi-tiered applications and distributed services.
- Simplifies the set-up and management of custom enterprise applications by incorporating all elements of each application, including relevant VMs, configurations, and related binaries, into an easy-to-use-blueprint.
- Publishes blueprints through the Nutanix Marketplace, giving end users the ability to request IT services that can then be instantly provisioned.
- Maintains control with role-based governance that limits user operations based on permissions and logs all activities for end-to-end traceability.

The Calm software is licensed on a per-VM basis in 25 VM packs. The Calm software licenses can be added during the initial purchase by selecting the software option listed in the following table.

Table 35. Calm software selection options

Description	Feature code	Quantity (per 25 VMs)
Calm 25 License Pack	B4E4	1

Also, Calm licenses can be added after the initial deployment by purchasing one of the software license options listed in the following table.

Table 36. Calm software license options

Description	Part number	Feature code	Quantity (per 25 VMs)
Nutanix Calm Standard, Per 25 VMs w/1Yr Support	7S0P000ZWW	B3D7	1
Nutanix Calm Standard, Per 25 VMs w/2Yr Support	7S0P0010WW	B3D8	1
Nutanix Calm Standard, Per 25 VMs w/3Yr Support	7S0P0011WW	B3D9	1
Nutanix Calm Standard, Per 25 VMs w/4Yr Support	7S0P0012WW	B3DA	1
Nutanix Calm Standard, Per 25 VMs w/5Yr Support	7S0P0013WW	B3DB	1

Configuration note: When adding the Calm software licenses after the initial deployment, customers should request a quote for the selected Calm part numbers from Lenovo and provide additional details on the existing installation.

Nutanix Flow

Nutanix Flow delivers advanced networking and security services, providing visibility into the virtual network, application-centric protection from network threats, and automation of common networking operations. The Flow software offers the following key features:

- Real-time visualization of communications between VMs helps implement appropriate network policies in a Nutanix environment.
- Micro-segmentation provides granular control and governance of all traffic into and out of a virtual machine with network policies attached to individual VMs and applications, rather than specific network segments.
- API-based notifications enable third party network devices to automate network configuration changes, such as VLAN provisioning or policy updates, in response to VM lifecycle events, such as adding a new VM.
- Service insertion and chaining enables virtualized network functions from third-party software (such as virtual firewalls and load balancers) to be deployed with VM traffic in a Nutanix environment.

The Flow software is licensed on a per-node basis. The Flow software license can be added during the initial purchase by selecting the software option listed in the following table,

Table 37. Flow software selection options

Description	Feature code	Quantity (per node)
Flow Single Node License	B4E5	1

Also, Flow licenses can be added after the initial deployment by purchasing one of the software license options listed in the following table.

Table 38. Flow software license options

Description	Part number	Feature code	Quantity (per node)
Nutanix Flow, Per Node w/1Yr Support	7S0P0014WW	B3DC	1
Nutanix Flow, Per Node w/2Yr Support	7S0P0015WW	B3DD	1
Nutanix Flow, Per Node w/3Yr Support	7S0P0016WW	B3DE	1
Nutanix Flow, Per Node w/4Yr Support	7S0P0017WW	B3DF	1
Nutanix Flow, Per Node w/5Yr Support	7S0P0018WW	B3DG	1

Configuration note: When adding the Flow software licenses after the initial deployment, customers should request a quote for the selected Flow part numbers from Lenovo and provide additional details on the existing installation.

SAP HANA

SAP HANA software licenses are purchased separately from SAP. Also, SUSE Linux Enterprise Server or Red Hat Enterprise Linux Server licenses are needed for deploying virtual machines for the SAP HANA virtualized environment. SAP HANA software stack is deployed at the customer site by Lenovo Professional Services that are required for the ThinkAgile HX7820 Appliance for SAP HANA.

Systems management

The ThinkAgile HX Series appliances for SAP HANA support the following systems management tools:

- Lenovo XClarity Controller
- Light path diagnostics
- Lenovo XClarity Administrator and XClarity Pro
- Lenovo XClarity Energy Manager

Lenovo XClarity Controller

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

XClarity Controller Enterprise offers the following capabilities for the HX Series appliances:

- Gathering and viewing system information and inventory
- Monitoring system status and health
- Alerting and notifications
- Event logging
- Syslog alerting
- Configuring security
- Updating system firmware
- Real-time power usage monitoring
- Displaying graphics for real-time and historical power usage data and temperature
- Capping power usage
- Remotely controlling power (Power on, Power off, Restart)

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

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

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

Light path diagnostics

The HX7820 appliances include basic light path diagnostics, which provides the system LEDs on the front of the appliance (see [Components and connectors](#)) and the LEDs near the monitored components (for example, the DIMM error LEDs on the system board). Also, the appliances offer an LCD display panel, which provides quick access to system status, firmware, network, and health information.

Lenovo XClarity Administrator and XClarity Pro

Lenovo XClarity Administrator is a centralized systems management solution that helps administrators deliver infrastructure faster. This solution integrates easily with Lenovo x86 servers, appliances, certified nodes, Top-of-Rack Ethernet switches, and storage systems, providing automated agent-less discovery, inventory, monitoring, and alerts across multiple systems. In addition, some managed endpoints support firmware updates and configuration management.

Lenovo XClarity Administrator is an optional software component for the ThinkAgile HX Series appliances which can be used to manage firmware upgrades outside of the Nutanix Prism software.

Notes:

- Lenovo XClarity Administrator can be downloaded and used at no charge to discover and monitor HX Series appliances and manage firmware upgrades for them.
- Optional Lenovo XClarity Pro subscription license that can be selected in the configurator provides software support for XClarity Administrator for the duration of the selected warranty period. If Lenovo XClarity software support is required, the XClarity Pro option must be selected.

The XClarity Pro license can be added during the initial purchase by selecting one of the software options listed in the following table.

Table 39. XClarity Pro selection options

Description	Feature code	Quantity (per node)
XClarity Pro	B0W3	1

Also, XClarity Pro licenses can be added after the initial deployment by purchasing one of the software license options listed in the following table.

Table 40. Lenovo XClarity Pro license options

Part number	Feature code	Description	Quantity (per node)
00MT201	1339	Lenovo XClarity Pro, per Managed Endpoint w/1 Yr SW S&S	1
00MT202	1340	Lenovo XClarity Pro, per Managed Endpoint w/3 Yr SW S&S	1
00MT203	1341	Lenovo XClarity Pro, per Managed Endpoint w/5 Yr SW S&S	1

Lenovo XClarity Administrator is available from Lenovo at no charge, and it offers the following features:

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

For more information, refer to the Lenovo XClarity Administrator Product Guide:
<http://lenovopress.com/tips1200>

Lenovo XClarity Energy Manager

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

Lenovo XClarity Energy Manager offers the following capabilities:

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

Lenovo XClarity Energy Manager license is included in the XClarity Controller Enterprise upgrade.

For more information, refer to the Lenovo XClarity Energy Manager web page:
<http://datacentersupport.lenovo.com/us/en/solutions/Invo-lxem>

Physical specifications

The ThinkAgile HX7820 Appliances for SAP HANA have the following dimensions and weight (approximate):

- Height: 173 mm (6.8 in.)
- Width: 447 mm (17.6 in.)
- Depth: 800 mm (31.5 in.)
- Weight (maximum): 58.7 kg (129.4 lb)

Operating environment

The ThinkAgile HX Series appliances comply with ASHRAE class A2 specifications. The appliance performance might be impacted when the operating temperature is outside the ASHRAE A2 specifications. Depending on the hardware configuration, some HX7820 appliances comply with ASHRAE class A3 and class A4 specifications. To comply with ASHRAE class A3 and class A4 specifications, the HX7820 appliances must meet the following configuration requirement: Processors with TDP more than or equal to 150 W not installed.

The HX Series appliances are supported in the following environment:

- Air temperature:
 - Operating:
 - ASHRAE Class A4: 5 °C - 45 °C (41 °F - 113 °F); for altitudes above 900 m (2,953 ft), decrease the maximum ambient temperature by 1 °C for every 125-m (410-ft) increase in altitude
 - ASHRAE Class A3: 5 °C - 40 °C (41 °F - 104 °F); for altitudes above 900 m (2,953 ft), decrease the maximum ambient temperature by 1 °C for every 175-m (574-ft) increase in altitude
 - ASHRAE Class A2: 10 °C - 35 °C (50 °F - 95 °F); for altitudes above 900 m (2,953 ft), decrease the maximum ambient temperature by 1 °C for every 300-m (984-ft) increase in altitude
 - Non-operating: 5 °C - 45 °C (41 °F - 113 °F)
 - Storage: -40 °C - +60 °C (-40 °F - 140 °F)
- Maximum altitude: 3,050 m (10,000 ft)
- Humidity:
 - Operating:
 - ASHRAE Class A4: 8% - 90% (non-condensing); maximum dew point: 24 °C (75 °F)
 - ASHRAE Class A3: 8% - 85% (non-condensing); maximum dew point: 24 °C (75 °F)
 - ASHRAE Class A2: 8% - 80% (non-condensing); maximum dew point: 21 °C (70 °F)
 - Storage: 8% - 90% (non-condensing)
- Electrical: 200 - 240 (nominal) V AC; 50 Hz / 60 Hz
- Acoustics (maximum configuration, operating): 6.1 bels
- Vibration:
 - Operating: 0.21 G rms at 5 Hz to 500 Hz for 15 minutes across 3 axes
 - Non-operating: 1.04 G rms at 2 Hz to 200 Hz for 15 minutes across 6 surfaces
- Shock:
 - Operating: 15 G for 3 milliseconds in each direction (positive and negative X, Y, and Z axes)
 - Non-operating:
 - 12 kg - 22 kg: 50 G for 152 in./sec velocity change across 6 surfaces
 - 23 kg - 31 kg: 35 G for 152 in./sec velocity change across 6 surfaces

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

Table 41. Rated system power, inlet current, and system heat output

Power supply	Source voltage	Maximum power load per system (four power supplies)	Rated current per inlet	System heat output
1600 W Platinum	200 - 240 V AC	4334 W	9 A	14788 BTU/hour

Regulatory compliance

The ThinkAgile HX7820 Appliances for SAP HANA conform to the following regulations:

- United States FCC Part 15, Class A
- Canada ICES-003/NMB-03, Class A
- UL/CSA 60950-1
- Mexico NOM-019
- Argentina IEC60950-1
- Japan VCCI, Class A
- Australia/New Zealand AS/NZS CISPR 22, Class A
- China CCC GB4943.1, GB9254 Class A, GB17625.1
- Taiwan BSMI CNS13438, Class A; CNS14336-1
- Korea KN22, Class A; KN24
- Russia/GOST ME01; IEC-60950-1; GOST R 51318.22, 51318.24, 51317.3.2, and 51317.3.3
- IEC 60950-1 (CB Certificate and CB Test Report)
- Europe CE Mark (EN55022 Class A, EN60950-1, EN55024, EN61000-3-2, EN61000-3-3)
- CISPR 22, Class A
- Germany TUV-GS (EN60950-1 /IEC60950-1,EK1-ITB2000)
- Reduction of Hazardous Substances (ROHS)
- Energy Star 3.0

Warranty and support

The ThinkAgile HX Series appliances can be configured with a three-, four, or five-year hardware warranty with 24x7 ThinkAgile Advantage Single Point of Support (Lenovo appliance hardware and 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.

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

The following Lenovo support services are available for selection:

- **Premier Support** provides a Lenovo-owned customer experience and delivers direct access to technicians skilled in hardware, software, and advanced troubleshooting, in addition to the following capabilities:
 - Direct technician-to-technician access through a dedicated phone line.
 - 24x7x365 remote support.
 - Single point of contact service.
 - End to end case management.
 - 3rd Party collaborative software support.
 - Online case tools and live chat support.
 - On-demand remote system analysis.
- **Warranty service level upgrades (Preconfigured Support)** are available to meet the on-site response time targets that match the criticality of customer's systems:
 - 3, 4, or 5 years of service coverage.
 - **Foundation Service:** 9x5 service coverage with next business day onsite response, with optional YourDrive YourData.
 - **Essential Service:** 24x7 service coverage with 4-hour onsite response or 24-hour committed repair (available only in select regions), bundled with YourDrive YourData.
 - **Advanced Service:** 24x7 service coverage with 2-hour onsite response or 6-hour committed repair (available only in select regions), bundled with YourDrive YourData.

- **Managed Services**

Lenovo Managed Services provide continuous 24x7 remote monitoring (plus 24x7 call center availability) and proactive management of a customer's data center using state of the art tools, systems, and practices by a team of highly skilled and experienced Lenovo services professionals.

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

- **Technical Account Management (TAM)**

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

- **Enterprise Software Support**

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

- **YourDrive YourData**

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

- **Health Check**

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

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

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

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

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

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

For service definitions, region-specific details, and service limitations, 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>

Nutanix software support

The ThinkAgile HX Series appliances include a three-, four-, or five-year Nutanix software support and subscription (matches the duration of the selected hardware warranty period) that entitles customers to submit service requests to troubleshoot Nutanix software issues and receive code updates, including fixes, patches, and new software releases.

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.

Software support that is provided by Nutanix includes 24x7 phone and web coverage with the following target response times (priorities are assigned by Nutanix based on the impact on productivity):

- Priority 1 (Emergency: Productivity halted): Within 30 minutes.
- Priority 2 (Critical: Significant impact on productivity): Within 2 hours.
- Priority 3 (Normal: Minimal impact on productivity): Within 4 hours.
- Priority 4 (Low: General requests for information): Within next two business days.

For more information, refer to the Lenovo Support Plan – ThinkAgile HX and Lenovo Converged HX Series:
<http://datacentersupport.lenovo.com/us/en/solutions/ht505404>

SAP HANA support

Lenovo solution support team works closely with SAP and is dedicated to troubleshooting the SAP HANA software and hardware issues and can coordinate any cross-company support functions (SAP, SUSE, Red Hat, Nutanix) that may be necessary to resolve the problem as soon as possible.

Deployment services

The following Lenovo Professional Services are available for the ThinkAgile HX Series appliances to get customers up and running quickly:

- 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 Nutanix containers and Acropolis (AHV) cluster
 - Transferring knowledge
- Nutanix deployment services - Advanced with XClarity (per cluster)
 - Nutanix deployment services - Advanced
 - Installing Lenovo XClarity
 - Installing system updates

The following optional Lenovo basic installation services are available for the ThinkAgile HX Series appliances:

- Unpacking and inspecting the systems
- 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)

The SAP HANA onsite deployment that is provided by Lenovo Professional Services is required for the ThinkAgile HX Series Appliances for SAP HANA.

Ethernet LAN switches

The following table lists the Ethernet LAN switches that are offered by Lenovo that can be used with the ThinkAgile HX7820 Appliances for SAP HANA for network connectivity.

Table 42. Ethernet LAN switches

Description	Part number
1 Gb Ethernet switches (IPMI management)	
Lenovo ThinkSystem NE0152T RackSwitch (Rear to Front)	7Y810011WW
Lenovo ThinkSystem NE0152TO RackSwitch (Rear to Front, ONIE)	7Z320011WW
Lenovo RackSwitch G7028 (Rear to Front)	7159BAX
Lenovo RackSwitch G7052 (Rear to Front)	7159CAX
Lenovo CE0128TB Switch (3-Year Warranty)	7Z340011WW
Lenovo CE0128TB Switch (Limited Lifetime Warranty)	7Z360011WW
Lenovo CE0128PB Switch (3-Year Warranty)	7Z340012WW
Lenovo CE0128PB Switch (Limited Lifetime Warranty)	7Z360012WW
Lenovo CE0152TB Switch (3-Year Warranty)	7Z350021WW
Lenovo CE0152TB Switch (Limited Lifetime Warranty)	7Z370021WW
Lenovo CE0152PB Switch (3-Year Warranty)	7Z350022WW
Lenovo CE0152PB Switch (Limited Lifetime Warranty)	7Z370022WW
10 Gb Ethernet switches (10 GbE host connectivity)	
Lenovo ThinkSystem NE1032 RackSwitch (Rear to Front)	7159A1X
Lenovo ThinkSystem NE1032T RackSwitch (Rear to Front)	7159B1X
Lenovo ThinkSystem NE1064TO RackSwitch (Rear to Front, ONIE)	7Z330011WW
Lenovo ThinkSystem NE1072T RackSwitch (Rear to Front)	7159C1X
Lenovo RackSwitch G8272 (Rear to Front)	7159CRW
25 Gb Ethernet switches (25 GbE host connectivity)	
Lenovo ThinkSystem NE2572 RackSwitch (Rear to Front)	7159E1X
Lenovo ThinkSystem NE2572O RackSwitch (Rear to Front, ONIE)	7Z210021WW
Lenovo ThinkSystem NE2580O RackSwitch (Rear to Front, ONIE)	7Z330021WW
100 Gb Ethernet switches (40 GbE/100 GbE aggregation layer; 10 GbE/25 GbE breakout host connectivity)	
Lenovo ThinkSystem NE10032 RackSwitch (Rear to Front)	7159D1X
Lenovo ThinkSystem NE10032O RackSwitch (Rear to Front, ONIE)	7Z210011WW

For more information, see the list of Product Guides in the Top-of-rack Switches category:
<http://lenovopress.com/servers/options/switches#rt=product-guide>

Rack cabinets

The following table lists the rack cabinets that are currently offered by Lenovo that can be used for mounting the ThinkAgile HX7820 Appliances for SAP HANA and other IT infrastructure building blocks.

Table 43. Rack cabinets

Description	Part number
25U S2 Standard Rack (1000 mm deep; 2 sidewall compartments)	93072RX
25U Static S2 Standard Rack (1000 mm deep; 2 sidewall compartments)	93072PX
42U S2 Standard Rack (1000 mm deep; 6 sidewall compartments)	93074RX
42U 1100mm Enterprise V2 Dynamic Rack (6 sidewall compartments)	93634PX
42U 1100mm Enterprise V2 Dynamic Expansion Rack (6 sidewall compartments)	93634EX
42U 1200mm Deep Dynamic Rack (6 sidewall compartments)	93604PX
42U 1200mm Deep Static Rack (6 sidewall compartments)	93614PX
42U Enterprise Rack (1105 mm deep; 4 sidewall compartments)	93084PX
42U Enterprise Expansion Rack (1105 mm deep; 4 sidewall compartments)	93084EX

For more information, see the list of Product Guides in the Rack Cabinets category:
<http://lenovopress.com/servers/options/racks#rt=product-guide>

Power distribution units

The following table lists the power distribution units (PDUs) that are currently offered by Lenovo that can be used for distributing electrical power to the ThinkAgile HX7820 Appliances for SAP HANA and other IT infrastructure building blocks mounted in a rack cabinet.

Table 44. Power distribution units

Description	Part number
0U Basic PDUs	
0U 36 C13/6 C19 24A/200-240V 1 Phase PDU with NEMA L6-30P line cord	00YJ776
0U 36 C13/6 C19 32A/200-240V 1 Phase PDU with IEC60309 332P6 line cord	00YJ777
0U 21 C13/12 C19 32A/200-240V/346-415V 3 Phase PDU with IEC60309 532P6 line cord	00YJ778
0U 21 C13/12 C19 48A/200-240V 3 Phase PDU with IEC60309 460P9 line cord	00YJ779
Switched and Monitored PDUs	
0U 20 C13/4 C19 Switched and Monitored 24A/200-240V/1Ph PDU w/ NEMA L6-30P line cord	00YJ781
0U 20 C13/4 C19 Switched and Monitored 32A/200-240V/1Ph PDU w/ IEC60309 332P6 line cord	00YJ780
0U 18 C13/6 C19 Switched / Monitored 32A/200-240V/346-415V/3Ph PDU w/ IEC60309 532P6 cord	00YJ782
0U 12 C13/12 C19 Switched and Monitored 48A/200-240V/3Ph PDU w/ IEC60309 460P9 line cord	00YJ783
1U 9 C19/3 C13 Switched and Monitored DPI PDU (without line cord)	46M4002
1U 9 C19/3 C13 Switched and Monitored 60A 3Ph PDU with IEC 309 3P+Gnd cord	46M4003
1U 12 C13 Switched and Monitored DPI PDU (without line cord)	46M4004
1U 12 C13 Switched and Monitored 60A 3 Phase PDU with IEC 309 3P+Gnd line cord	46M4005
Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets)	
Ultra Density Enterprise C19/C13 PDU Module (without line cord)	71762NX
Ultra Density Enterprise C19/C13 PDU 60A/208V/3ph with IEC 309 3P+Gnd line cord	71763NU

Description	Part number
C13 Enterprise PDUs (12x IEC 320 C13 outlets)	
DPI C13 Enterprise PDU+ (without line cord)	39M2816
DPI Single Phase C13 Enterprise PDU (without line cord)	39Y8941
C19 Enterprise PDUs (6x IEC 320 C19 outlets)	
DPI Single Phase C19 Enterprise PDU (without line cord)	39Y8948
DPI 60A 3 Phase C19 Enterprise PDU with IEC 309 3P+G (208 V) fixed line cord	39Y8923
Front-end PDUs (3x IEC 320 C19 outlets)	
DPI 30amp/125V Front-end PDU with NEMA L5-30P line cord	39Y8938
DPI 30amp/250V Front-end PDU with NEMA L6-30P line cord	39Y8939
DPI 32amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8934
DPI 60amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8940
DPI 63amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8935
Universal PDUs (7x IEC 320 C13 outlets)	
DPI Universal 7 C13 PDU (with 2 m IEC 320-C19 to C20 rack power cord)	00YE443
NEMA PDUs (6x NEMA 5-15R outlets)	
DPI 100-127V PDU with fixed NEMA L5-15P line cord	39Y8905
Line cords for PDUs that ship without a line cord	
DPI 30a Line Cord (NEMA L6-30P)	40K9614
DPI 32a Line Cord (IEC 309 P+N+G)	40K9612
DPI 32a Line Cord (IEC 309 3P+N+G)	40K9611
DPI 60a Cord (IEC 309 2P+G)	40K9615
DPI 63a Cord (IEC 309 P+N+G)	40K9613
DPI Australian/NZ 3112 Line Cord (32A)	40K9617
DPI Korean 8305 Line Cord (30A)	40K9618

For more information, see the list of Product Guides in the PDU category:
<http://lenovopress.com/servers/options/pdu#rt=product-guide>

Uninterruptible power supply units

The following table lists the uninterruptible power supply (UPS) units that are currently offered by Lenovo that can be used for providing electrical power protection to the ThinkAgile HX7820 Appliances for SAP HANA and other IT infrastructure building blocks.

Table 45. Uninterruptible power supply units

Description	Part number
Worldwide models	
RT1.5kVA 2U Rack or Tower UPS (100-125VAC) (8x NEMA 5-15R 12A outlets)	55941AX
RT1.5kVA 2U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A outlets)	55941KX
RT2.2kVA 2U Rack or Tower UPS (100-125VAC) (8x NEMA 5-20R 16A outlets)	55942AX
RT2.2kVA 2U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 1x IEC 320 C19 16A outlets)	55942KX
RT3kVA 2U Rack or Tower UPS (100-125VAC) (6x NEMA 5-20R 16A, 1x NEMA L5-30R 24A outlets)	55943AX
RT3kVA 2U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 1x IEC 320 C19 16A outlets)	55943KX
RT5kVA 3U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 2x IEC 320 C19 16A outlets)	55945KX
RT6kVA 3U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 2x IEC 320 C19 16A outlets)	55946KX
RT8kVA 6U Rack or Tower UPS (200-240VAC) (4x IEC 320-C19 16A outlets)	55948KX
RT11kVA 6U Rack or Tower UPS (200-240VAC) (4x IEC 320-C19 16A outlets)	55949KX
RT8kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC) (4x IEC 320-C19 16A outlets)	55948PX
RT11kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC) (4x IEC 320-C19 16A outlets)	55949PX
ASEAN, HTK, INDIA, and PRC models	
ThinkSystem RT3kVA 2U Standard UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets)	55943KT
ThinkSystem RT3kVA 2U Long Backup UPS (200-230VAC) (2x C13 10A, 2x GB 10A, 1x C19 16A outlets)	55943LT
ThinkSystem RT6kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output)	55946KT
ThinkSystem RT10kVA 5U UPS (200-230VAC) (2x C13 10A outlets, 1x Terminal Block output)	5594XKT

For more information, see the list of Product Guides in the Uninterruptible Power Supply Units category:

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

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

Related publications and links

For more information, see these resources:

- Lenovo ThinkAgile HX Series
<http://www3.lenovo.com/us/en/p/WMD00000326>
- Lenovo Data Center Solution Configurator (DCSC):
<http://dcsc.lenovo.com>
- Nutanix documentation
<http://portal.nutanix.com/#/page/docs>
- Lenovo ThinkAgile HX Series Best Recipes
<http://datacentersupport.lenovo.com/us/en/solutions/ht505413>
- Lenovo Data Center Support
<http://datacentersupport.lenovo.com>

Related product families

Product families related to this document are the following:

- [Hyperconverged Infrastructure](#)
- [Hyperconverged Infrastructure](#)
- [Nutanix Alliance](#)
- [SAP Alliance](#)
- [SAP HANA](#)
- [ThinkAgile HX Series for Nutanix](#)

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