Lenovo Converged HX3310, HX3310-F, HX3510-G, HX3710, and HX3710-F Appliances

Product Guide (withdrawn product)

Lenovo Converged HX Series Nutanix Appliances 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 Intel Xeon processor E5-2600 v4 product family.

Several common uses for the Lenovo Converged HX3000 Series appliances for compute-heavy workloads include virtual desktop infrastructure (VDI), server virtualization, private/hybrid clouds, enterprise applications, light databases, and remote office and branch office workloads. Starting with as few as three nodes to keep your acquisition costs down, the HX Series is capable of immense scalability as your needs grow.

The Lenovo Converged HX3000 Series include Lenovo Converged HX3310 and HX3310-F (1U rack-mount), HX3510-G (2U rack mount), and HX3710 and HX3710-F (2U 4-node [2U4N] rack-mount) appliances that are shown in the following figure.

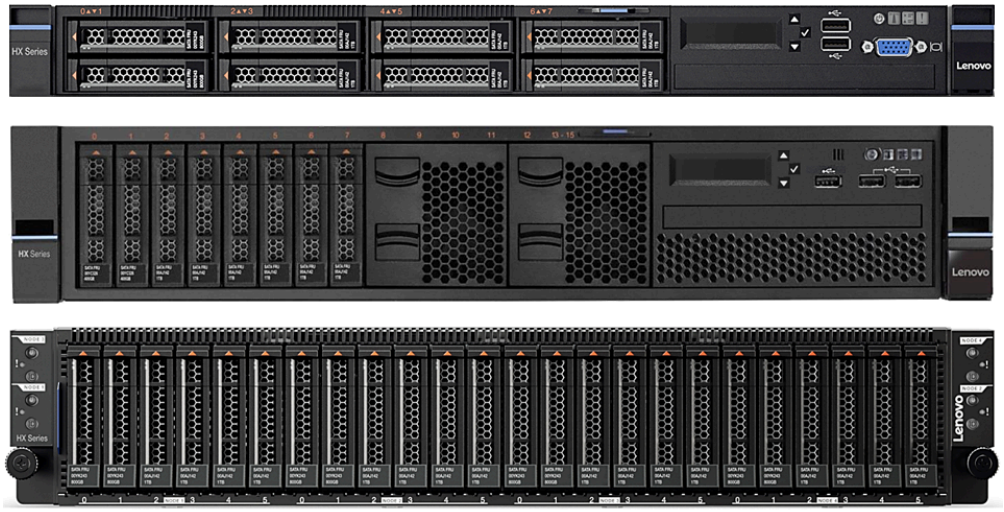

Figure 1. Lenovo Converged HX3310/HX3310-F (top), HX3510-G (middle), and HX3710/HX3710-F (bottom)

Did you know?

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

The Lenovo Converged HX Series appliances deliver the industry's most feature-rich hyperconverged infrastructure to enterprise datacenters, bringing the benefits of web-scale technologies to enterprise applications through enterprise storage, data protection, infrastructure resilience, management and analytics, and security.

Key features

The Lenovo Converged HX Series Nutanix Appliances deliver the industry's most feature-rich hyperconverged infrastructure to enterprise datacenters (shown in the following figure). Nutanix brings the benefits of web-scale technologies to enterprise applications through enterprise storage, data protection, infrastructure resilience, management and analytics, and security.

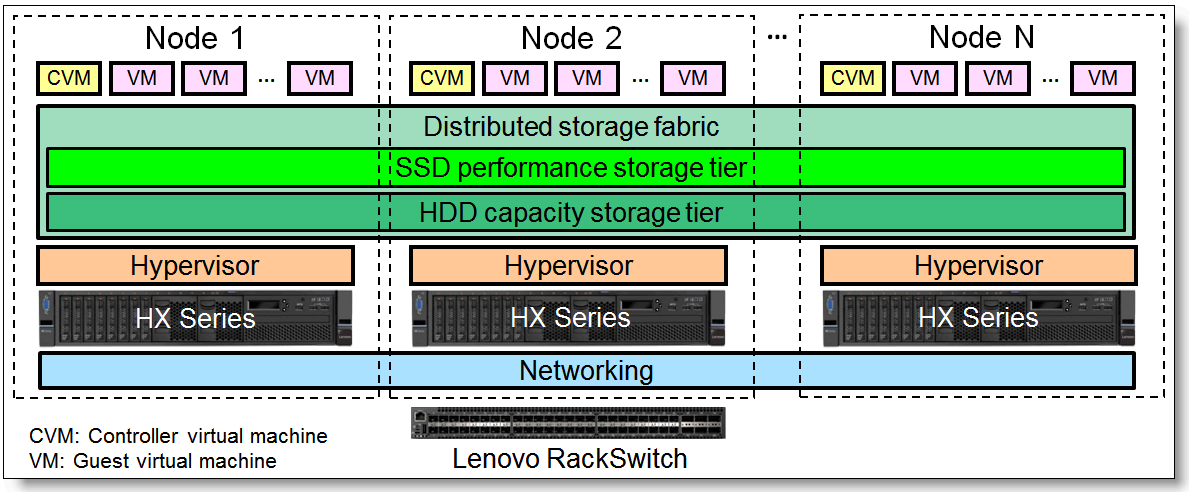

Figure 2. HX Series hyperconverged infrastructure

The Lenovo Converged HX Series appliances offer the following key features:

- Enterprise storage

  The Lenovo Converged HX Series Nutanix Appliances deliver enterprise data storage as an on-demand service by employing highly distributed software architecture. The Nutanix Software eliminates the need for traditional SAN and NAS solutions, and delivers a rich set of software-defined services that are entirely VM-centric, including snapshots, high availability, disaster recovery, deduplication and more.

  - Inline and post-process compression at the sub-block level increase effective storage capacity by up to four times.
  - Redirect-on-write snapshots and writeable clones at the granularity of a single VM increase efficiency.
  - Distributed caching of VM data improves performance in multi-reader scenarios, such as VDI with linked clones.
  - Inline deduplication in the read cache and post-process deduplication in the capacity tier improve performance and effective capacity.
  - Powerful acceleration capabilities such as caching, automatic data tiering and data locality speed storage performance.

- Data protection

  The Nutanix Software offers a natively integrated solution for data protection and continuous availability at VM granularity. It gives administrators an affordable range of options to meet the recovery point objectives (RPO) and recovery time objectives (RTO) for different applications.

  - Unlimited local backups using VM-centric snapshots and integrated workflows delivering RPO in minutes.
  - Natively integrated solution for disaster recovery enables simple VM-centric backup, recovery and replication with application-level consistency.
  - Built-in Cloud Connect hybrid cloud technology enables seamless backup of data to public cloud services.
  - Metro availability feature provides continuous availability of data across different sites during planned maintenance or disasters through synchronous replication.
  - Support for Microsoft Volume Shadow Services (VSS), VMware vStorage API for Data Protection (VADP), and seamless integration with third-party backup providers.

- Infrastructure resilience

  The platform for the Lenovo Converged HX Series Nutanix Appliances is fault resistant, with no single point of failure and no bottlenecks. The system uses a shared-nothing architecture, where all data, metadata and services are distributed to all nodes within the cluster, and is built to detect, isolate and recover from failures anywhere in the system. Lenovo hyperconverged appliances deliver always-on operation, and can survive system hardware, software and hypervisor issues and maintain 100% availability to applications and data.

  - Intelligent data placement in different physical failure domains, or availability domains, (for example, separate racks or power sources) delivers greater fault tolerance.
  - Data and metadata replicated across multiple nodes provide user-defined resilience against hardware failures.
  - Multiple copies of data ensure 100% data availability in the event that a Nutanix controller VM is unavailable due to failure or maintenance.
  - Automatic integrity checks during reads and silent at-rest error detection for data consistency.

- Management and analytics

  The platform for the Lenovo Converged HX Series Nutanix Appliances marries web-scale capabilities with an intuitive user-centric management experience to simplify every aspect of the IT infrastructure lifecycle. Nutanix Prism provides a single pane of glass to monitor and control one or more Nutanix clusters, with simplified workflows and rich automation for common administrative tasks.

  - Elegantly simple management framework with intuitive workflows delivers radical simplicity and powerful control to IT management.
  - Single pane of glass delivers centralized visibility and management of multiple Nutanix clusters across the world.
  - Rich automation and intuitive workflows simplify deployment, provisioning, orchestration and maintenance of Nutanix clusters.
  - End-to-end visibility of VMs, nodes and disks and the ability to visually diagnose potential issues gives administrators total infrastructure control.
  - Programmatic control of every aspect of cluster management, including deployment, upgrades, data protection, and performance management enables powerful automation.
  - Streamlined management for hypervisor and virtual machines on Nutanix.

- Security

  Nutanix software combines powerful 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.

  - Security incorporated into every step of the software development process enables verifiably secure software releases.
  - Encryption of sensitive data with self-encrypting drives (SEDs) that are FIPS 140-2 Level 2 conformant supports stringent encryption requirements.
  - Two-step authentication using a client certificate and username/password, along with cluster lockdown, provides protection against unauthorized access.

Components and connectors

The following figure shows the front view of the HX3310 or HX3310-F appliance.

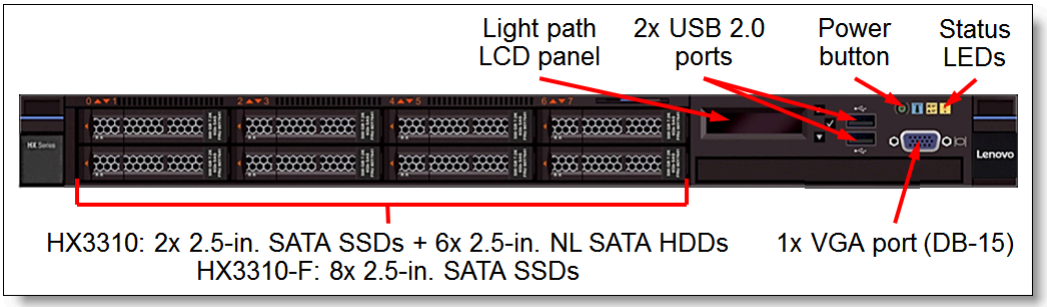

Figure 3. HX3310 or HX3310-F front view

The following figure shows the front view of the HX3510-G appliance.

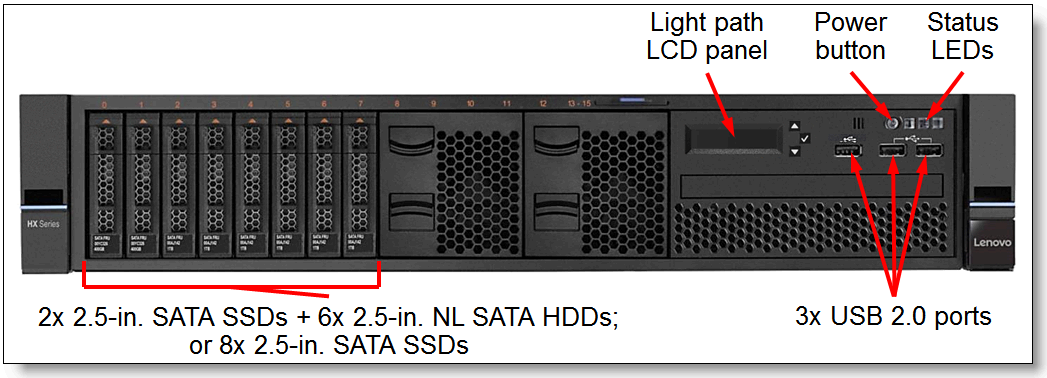

Figure 4. HX3510-G front view

The following figure shows the front view of the HX Series Enclosure with up to four HX3710 or HX3710-F appliance nodes.

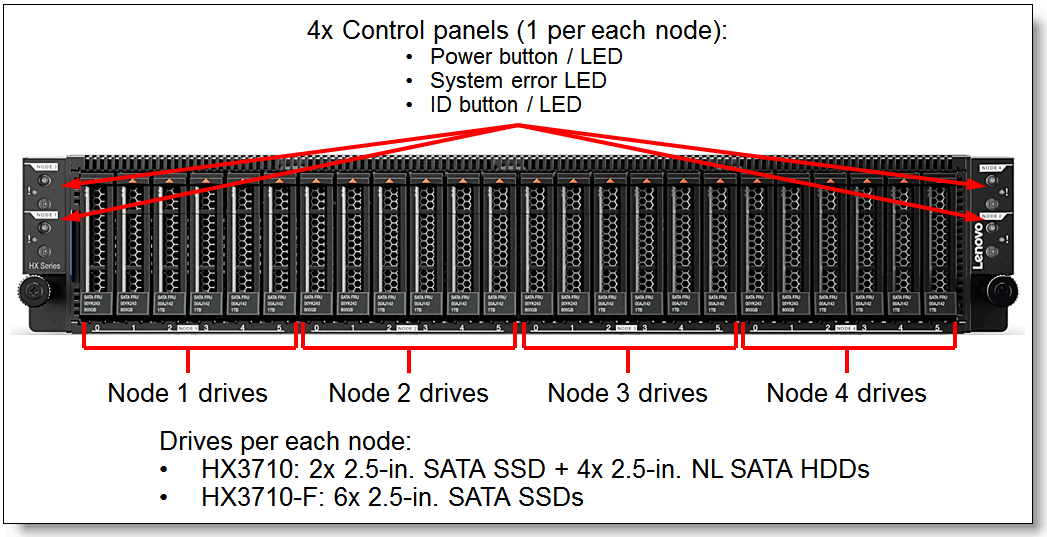

Figure 5. HX Series Enclosure with up to four HX3710 or HX3710-F appliances front view

The following figure shows the rear view of the HX3310 or HX3310-F appliance.

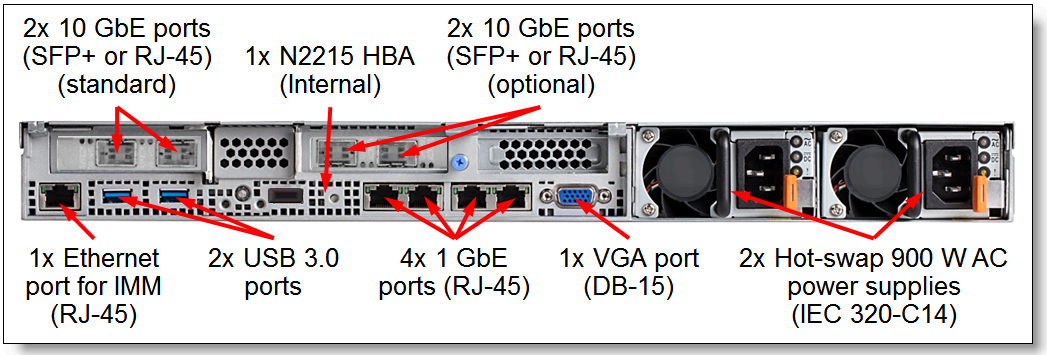

Figure 6. HX3310 or HX3310-F rear view

The following figure shows the rear view of the HX3510-G appliance.

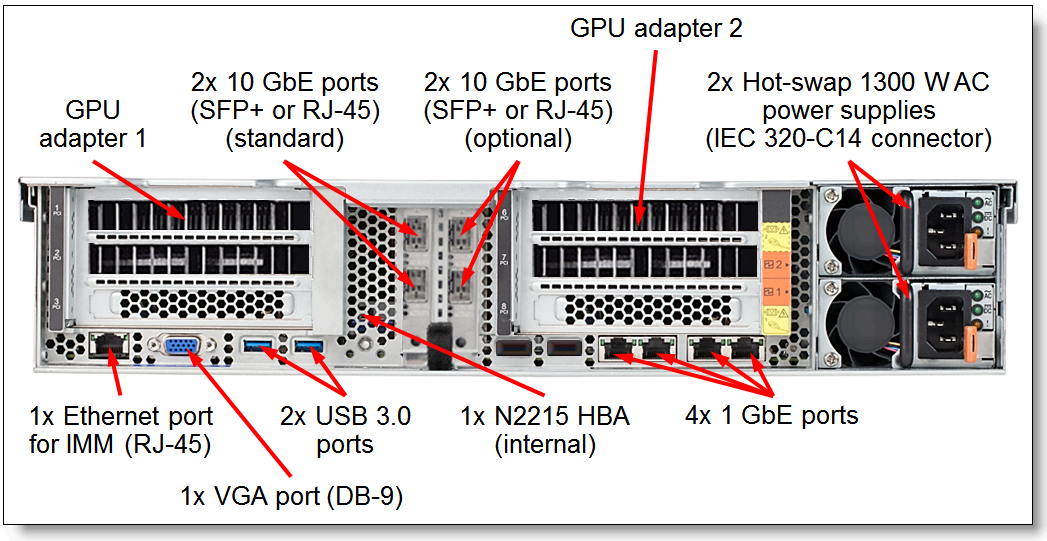

Figure 7. HX3510-G rear view

The following figure shows the rear view of the HX Series Enclosure with up to four HX3710 or HX3710-F appliance nodes.

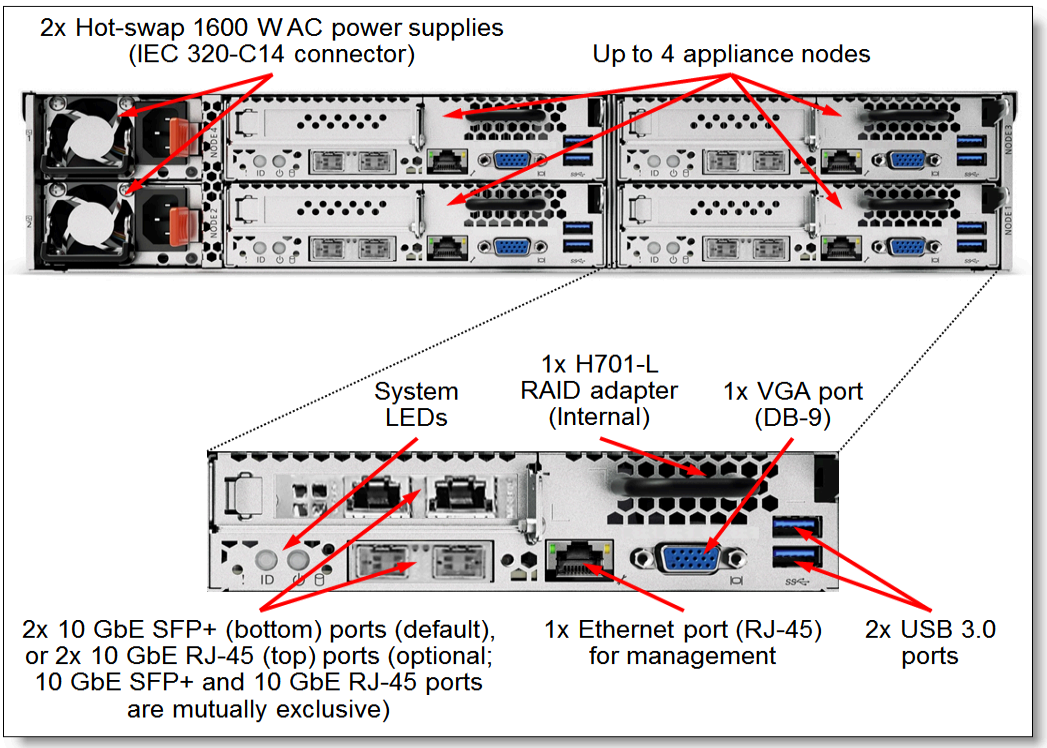

Figure 8. HX Series Enclosure with up to four HX3710 or HX3710-F appliances rear view

System specifications

The following table lists the system specifications of the Converged HX3310 and HX3310-F appliances.

Table 1. HX3310 and HX3310-F appliance specifications

Attribute	Specification
Form factor	1U Rack-mount (Machine Type 8693).
Processor	Two processors of the Intel Xeon processor E5-2600 v4 product family: • Up to 22 cores per processor (2.2 GHz core speeds) • Up to 2.4 GHz core speeds (14 cores per processor) • Two QPI links up to 9.6 GT/s each per processor • Up to 55 MB cache per processor • Up to 2400 MHz memory speed
Chipset	Intel C612.
Memory	24 DIMM sockets. Support for 16 GB and 32 GB RDIMMs or 64 GB LRDIMMs. Memory speed up to 2400 MHz.
Memory capacity	Up to 1536 GB with 24x 64 GB LRDIMMs.
Memory protection	ECC and Chipkill.
Drive bays	8x 2.5-inch SAS/SATA hot-swap
Storage capacity	• HX3310: Up to 12 TB (HDD) + 3.2 TB (SSD) • HX3310-F: Up to 30.72 TB (SSDs)
Storage controller	1x N2215 (12 Gbps SAS/6 Gbps SATA)
Network interfaces	• One or two dual-port 10 GbE SFP+ (Intel X520) or 10GBASE-T (Intel X550-T2) adapters. • 4x integrated RJ-45 Gigabit Ethernet 1000BASE-T ports (BCM5719). • 1x Ethernet (RJ-45) for systems management.
Boot drive	1x Embedded 64 GB SSD (6 Gbps SATA DOM) connected to the onboard PCH SATA controller.
I/O expansion slots	Four slots. The slots are as follows: • Slot 1: PCIe 3.0 x16; low profile, half-length (for the first 10 GbE network adapter) • Slot 2: PCIe 3.0 x16; low profile, half-length (for the second 10 GbE network adapter) • Slot 3: PCIe 3.0 x16; low profile, half-length (not used) • Slot 4: PCIe 3.0 x8 (dedicated for an internal storage controller)
Ports	• Front: 2x USB 2.0 and 1x DB-15 VGA. • Rear: 2x USB 3.0 and 1x DB-15 VGA.
Cooling	Calibrated Vectored Cooling with seven redundant hot-swap system fans; two fan zones with N+1 fan redundancy.
Power supply	Two redundant hot-swap 900 W (100 - 240 V) High Efficiency Platinum AC power supplies.
Video	Matrox G200eR2 with 16 MB memory integrated into the IMM2.1. Maximum resolution is 1600x1200 at 75 Hz with 16 M colors.
Hot-swap parts	SSDs, HDDs, power supplies, and fans.
Systems management	UEFI, Integrated Management Module II (IMM2.1) (based on Renesas SH7758) with Advanced Upgrade, Predictive Failure Analysis, light path diagnostics, Lenovo XClarity, and Nutanix Prism.
Security features	Power-on password, administrator's password, Trusted Platform Module (TPM) 2.0-ready.
Software	Nutanix Acropolis: Starter, Pro, and Ultimate editions.

Attribute	Specification
Hypervisors	• Nutanix Acropolis Hypervisor (default factory preload). • VMware ESXi 5.5 Update 3, 6.0 Update 1, and 6.0 Update 2 (optional factory preload). • Optional support for Microsoft Windows Server 2012 R2 Datacenter Edition (Hyper-V) (field-installable option only).
Hardware warranty	Three-year or five-year customer-replaceable unit and onsite limited warranty with selectable service levels: 9x5 next business day (NBD), 24x7x4, and 24x7x2.
Software maintenance	Three-year or five-year software support and subscription (matches the duration of the selected warranty period).
Dimensions	Height: 43 mm (1.7 in), width: 434 mm (17.1 in), depth: 734 mm (28.9 in)
Weight	Maximum configuration: 19.3 kg (42.5 lb)

The following table lists the system specifications of the Converged HX3510-G Series appliances.

Table 2. HX3510-G system specifications

Attribute	Specification
Form factor	2U Rack-mount (Machine Type 8695).
Processor	Two processors of the Intel Xeon processor E5-2600 v4 product family: • Up to 18 cores (2.3 GHz core speeds) • Up to 2.4 GHz core speeds (14 cores) • Two QPI links up to 9.6 GT/s each • Up to 45 MB cache • Up to 2400 MHz memory speed
Chipset	Intel C612.
Memory	24 DIMM sockets. Support for 16 GB and 32 GB RDIMMs or 64 GB LRDIMMs. Memory speed up to 2400 MHz.
Memory capacity	Up to 1536 GB with 24x 64 GB RDIMMs.
Memory protection	ECC and Chipkill.
Drive bays	8x 2.5-inch SAS/SATA hot-swap
Storage capacity	• Up to 12 TB (HDD) + up to 3.2 TB (SSD); or • Up to 30.72 TB (SSD)
Storage controller	1x N2215 (12 Gbps SAS/6 Gbps SATA)
Network interfaces	• One or two dual-port 10 GbE SFP+ (Intel X520) or 10GBASE-T (Intel X550-T2) adapters. • Four integrated RJ-45 Gigabit Ethernet 1000BASE-T ports (BCM5719). • One RJ-45 GbE systems management port.
Boot drive	1x Embedded 64 GB SSD (6 Gbps SATA DOM) connected to the onboard PCH SATA controller.
I/O expansion slots	Seven slots. The slots are as follows: • Slot 1: PCIe 3.0 x16; full-height, full-length (for the first GPU adapter) • Slot 3: PCIe 3.0 x8; full-height, half-length (not used) • Slot 4: PCIe 3.0 x8; low profile (for the first 10 GbE network adapter) • Slot 5: PCIe 3.0 x8; low profile (for the second 10 GbE network adapter) • Slot 6: PCIe 3.0 x16; full-height, full-length (for the second GPU adapter) • Slot 8: PCIe 3.0 x8; full-height, half-length (not used) • Slot 9: PCIe 3.0 x8 (for the N2215 storage controller)
Ports	• Front: 3x USB 2.0. • Rear: 2x USB 3.0, 1x DB-15 VGA.

Attribute	Specification
Cooling	Calibrated Vectored Cooling with six redundant hot-swap system fans; two fan zones with N+1 fan redundancy.
Power supply	Two redundant hot-swap 1300 W (200 - 240 V) High Efficiency Titanium AC power supplies.
Video	Matrox G200eR2 with 16 MB memory integrated into the IMM2.1. Maximum resolution is 1600x1200 at 75 Hz with 16 M colors.
Hot-swap parts	SSDs and HDDs, power supplies, and fans.
Systems management	UEFI, Integrated Management Module II (IMM2.1) (based on Renesas SH7758) with Advanced Upgrade, Predictive Failure Analysis, light path diagnostics, Lenovo XClarity, Nutanix Prism.
Security features	Power-on password, administrator's password, Trusted Platform Module (TPM) 2.0-ready.
Software	Nutanix Acropolis: Starter, Pro, and Ultimate editions.
Hypervisors	• Nutanix Acropolis Hypervisor (default factory preload). • VMware ESXi 5.5 Update 3, 6.0 Update 1, and 6.0 Update 2 (optional factory preload). • Optional support for Microsoft Windows Server 2012 R2 Datacenter Edition (Hyper-V) (field-installable option only).
Hardware warranty	Three-year or five-year customer-replaceable unit and onsite limited warranty with selectable service levels: 9x5 next business day (NBD), 24x7x4, and 24x7x2.
Software maintenance	Three-year or five-year software support and subscription (matches the duration of the selected warranty period).
Dimensions	Height: 87 mm (3.4 in), width: 446 mm (17.5 in), depth: 800 mm (31.5 in)
Weight	Maximum configuration: 34 kg (75 lb)

The following table lists the system specifications of the Converged HX3710 and HX3710-F appliances.

Table 3. HX3710 and HX3710-F appliance specifications

Attribute	Specification
Form factor	HX Series enclosure: 2U Four-node (2U4N) rack-mount. HX3710/HX3710-F: Half-wide, 1U node (Machine Type 8689); up to four nodes per enclosure.
Processor	Two processors of the Intel Xeon processor E5-2600 v4 product family: • Up to 20 cores per processor (2.2 GHz core speeds) • Up to 2.4 GHz core speeds (14 cores per processor) • Two QPI links up to 9.6 GT/s each per processor • Up to 50 MB cache per processor • Up to 2400 MHz memory speed
Chipset	Intel C612.
Memory	16 DIMM sockets. Support for 16 GB and 32 GB RDIMMs. Memory speed up to 2400 MHz.
Memory capacity	Up to 512 GB with 16x 32 GB RDIMMs.
Memory protection	ECC and Chipkill.
Drive bays	6x 2.5-inch SAS/SATA hot-swap drive bays per node in the enclosure (24 drives per enclosure).
Storage capacity	HX3710: Up to 8 TB (HDD) + 3.2 TB (SSD). HX3710-F: Up to 9.6 TB (SSD).
Storage controller	1x H701-L (6 Gbps SAS/SATA)
Network interfaces	• 2x 10 GbE SFP+ ports (Intel X520 mezz card) or 2x 10 GbE RJ-45 ports (Intel X550-T2 PCIe adapter). • 1x Ethernet RJ-45 port for systems management.

Attribute	Specification
Boot drive	1x Embedded 64 GB SSD (6 Gbps SATA DOM) connected to the onboard PCH SATA controller.
I/O expansion slots	Three PCIe slots. The slots are as follows: • Slot 1: PCIe 3.0 x16; low profile (not used) • Slot 2: PCIe 3.0 x8; OCP form factor (for the 10 GbE mezzanine card) • Slot 3: PCIe 3.0 x8; mezzanine slot (dedicated for an internal storage controller)
Ports	Rear: 2x USB 3.0 and 1x DB-15 VGA.
Cooling	Five simple-swap speed-controlled system fans in the enclosure
Power supply	Two redundant hot-swap 1600 W AC (200 - 240 V) 80 PLUS Platinum-certified power supplies in the enclosure.
Video	Onboard VGA controller with 16 MB memory integrated into the service processor (ASPEED AST2400). Maximum resolution is 1920x1200 at 60 Hz with 32 bits per pixel.
Hot-swap parts	SSDs, HDDs, and power supplies.
Systems management	UEFI, system LEDs, ThinkServer Management Module (TMM) (ASPEED AST2400) with remote presence (keyboard, video, mouse, and remote drive), Lenovo XClarity, and Nutanix Prism.
Security features	Power-on password, administrator's password.
Software	Nutanix Acropolis: Starter, Pro, and Ultimate editions.
Hypervisors	• Nutanix Acropolis Hypervisor (default factory preload). • VMware ESXi 5.5 Update 3, 6.0 Update 1, and 6.0 Update 2 (optional factory preload). • Optional support for Microsoft Windows Server 2012 R2 Datacenter Edition (Hyper-V) (field-installable option only).
Hardware warranty	Three-year or five-year customer-replaceable unit and onsite limited warranty with selectable service levels: 9x5 next business day (NBD), 24x7x4, and 24x7x2.
Software maintenance	Three-year or five-year software support and subscription (matches the duration of the selected warranty period).
Dimensions	• Enclosure: Height: 87 mm (3.4 in), width: 442 mm (17.4 in), depth: 835 mm (32.9 in) • Node: Height: 41 mm (1.6 in), width: 216 mm (8.5 in), depth: 659 mm (25.9 in)
Weight	• Enclosure: Maximum configuration: 36.9 kg (81 lb) • Node: Maximum configuration: 6.2 kg (13.6 lb)

Factory-integrated models

Factory-integrated models of the Converged HX Series appliances are configured by using one of the following configuration tools:

- Lenovo Enterprise Solutions Configurator (LESC):
  http://lesc.lenovo.com
- System x and Cluster Solutions Configurator (x-config):
  http://lesc.lenovo.com/products/hardware/configurator/worldwide/bhui/asit/

During the configuration process, you are selecting one of the base 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 Lenovo Converged HX Series appliances.

The following table lists the base models of the Lenovo Converged HX3000 Series appliances.

Product availability: HX3710 and HX3710-F appliances are withdrawn from marketing and no longer available for ordering.

Table 4. Base models of the Lenovo Converged HX3000 Series appliances

Description	Machine Type-Model
HX3310 Nutanix Appliance	8693-AC2
HX3310-F Nutanix Appliance	8693-AC3
HX3510-G Nutanix Appliance	8695-AC3
HX3710 Nutanix Appliance	8689-AC1
HX3710-F Nutanix Appliance	8689-AC2

The following table lists the default configurations of each appliance.

Table 5. Default configurations

Model	Intel Xeon processor	Memory	Storage controller	Drives	NIC
HX3310	2x E5-2650 v4	512 GB (16x 32 GB RDIMMs)	1x N2215	6x 1 TB 2.5" HDDs 2x 800 GB 2.5" SSDs 1x 64 GB Embedded SSD (hypervisor)	2x 10 GbE 4x 1 GbE
HX3310-F	2x E5-2680 v4	512 GB (16x 32 GB RDIMMs)	1x N2215	8x 800 GB 2.5" SSDs 1x 64 GB Embedded SSD (hypervisor)	2x 10 GbE 4x 1 GbE
HX3510-G	2x E5-2680 v4	256 GB (8x 32 GB RDIMMs)	1x N2215	6x 1 TB 2.5" HDDs 2x 800 GB 2.5" SSDs 1x 64 GB Embedded SSD (hypervisor)	2x 10 GbE 4x 1 GbE
HX3710	2x E5-2650 v4	256 GB (8x 32 GB RDIMMs)	1x H701-L	4x 1 TB 2.5" HDDs 2x 800 GB 2.5" SSDs 1x 64 GB Embedded SSD (hypervisor)	2x 10 GbE
HX3710-F	2x E5-2680 v4	256 GB (8x 32 GB RDIMMs)	1x H701-L	6x 800 GB 2.5" SSDs 1x 64 GB Embedded SSD (hypervisor)	2x 10 GbE

The Lenovo Converged HX3310 and HX3310-F appliances ship with the following items:

- System documentation
- Gen II Universal Slides Kit
- Enterprise 1U Cable Management Arm (CMA)
- Two 2.8 m IEC 320-C13 to C14 rack power cables

The Lenovo Converged HX3310-G appliances ship with the following items:

- System documentation
- Enterprise Slides Kit
- Enterprise 2U Cable Management Arm (CMA)
- Two 2.8 m IEC 320-C13 to C14 rack power cables

The Lenovo Converged HX3710 and HX3710-F appliances ship with the following items:

- System documentation
- Rail kit (enclosure only)
- One 2 m 2x IEC 320-C13 to C14 rack power cable (Y-cable) (enclosure only)

It is possible to perform a hardware upgrade after the initial deployment, such as adding more memory or network adapters, by purchasing the hardware upgrade option listed in the following table.

Table 6. Hardware upgrade option

Description	Part number	Quantity
Nutanix HW Upgrade	01KT971	1

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

TopSeller models

TopSeller models of the Converged HX Series appliances are pre-configured bundles that cannot be upgraded with additional options. TopSeller models are region-specific; that is, each region may define their own models, and not all models are available in every region.

Product availability: HX Series TopSeller models are available only in North America.

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

The following table lists the TopSeller models of the Lenovo Converged HX3000 Series appliances.

Table 7. TopSeller models

Model number	Intel Xeon processor	Memory	Storage controller	Drives	NIC	Software edition
HX3310						
8693E1U	2x E5-2630 v4	128 GB (8x 16 GB RDIMMs)	1x N2215	6x 1 TB 2.5" HDDs 2x 480 GB 2.5" SSDs 1x Embedded 64 GB SSD (hypervisor)	2x 10 GbE 4x 1 GbE	Pro

The HX3310 TopSeller models ship with the following items:

- System documentation
- Gen II Universal Slides Kit
- Enterprise 1U Cable Management Arm (CMA)
- Two 2.8 m IEC 320-C13 to C14 rack power cables

Processors

The Lenovo Converged HX3000 Series appliances ship with two processors. The following table lists the processor options that are available for selection.

Table 8. Processor options

Description	Quantity	HX3310	HX3310-F	HX3510-G	HX3710	HX3710-F
Intel Xeon Processor E5-2620 v4 8C 2.2GHz 20MB Cache 2133MHz 85W	2	Y	N	N	Y	N
Intel Xeon Processor E5-2630 v4 10C 2.2GHz 25MB Cache 2133MHz 85W	2	Y	N	Y	Y	N
Intel Xeon Processor E5-2650 v4 12C 2.2GHz 30MB Cache 2400MHz 105W	2	Y	Y	Y	Y	Y
Intel Xeon Processor E5-2680 v4 14C 2.4GHz 35MB Cache 2400MHz 120W	2	Y	Y	Y	Y	Y
Intel Xeon Processor E5-2697 v4 18C 2.3GHz 45MB Cache 2400MHz 145W	2	Y	Y	Y	N	N
Intel Xeon Processor E5-2698 v4 20C 2.2GHz 50MB Cache 2400MHz 135W	2	N	N	N	Y	Y
Intel Xeon Processor E5-2699 v4 22C 2.2GHz 55MB Cache 2400MHz 145W	2	Y	Y	Y	N	N

Memory

The Lenovo Converged HX3000 Series appliances support Lenovo TruDDR4 memory. TruDDR memory is selected, tested and tuned to maximize performance and reliability, and it enables extended memory performance features to support memory speeds that exceed industry standards.

The HX3310, HX3310-F, and HX3510-G appliances support up to 24 DIMMs (12 DIMMs per processor). Each processor has four memory channels, and there are three DIMMs per channel.

The HX3710 and HX3710-F appliances support up to 16 DIMMs (8 DIMMs per processor). Each processor has four memory channels, and there are two DIMMs per channel.

The appliances support ECC and Chipkill memory protection technologies.

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

Table 9. Memory options

Selection option	Description	Quantity	HX3310	HX3310-F	HX3510-G	HX3710	HX3710-F
RDIMMs							
128 GB	16GB TruDDR4 (2Rx4, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	8	Y	Y	Y	Y	Y
256 GB	32GB TruDDR4 (2Rx4, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	8	Y	Y	Y	Y	Y
384 GB	16GB TruDDR4 (2Rx4, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	24	Y	Y	Y	N	N
512 GB	32GB TruDDR4 (2Rx4, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	16	Y	Y	Y	Y*	Y*
768 GB	32GB TruDDR4 (2Rx4, 1.2V) PC4-19200 CL17 2400MHz LP RDIMM	24	Y	Y	Y	N	N
LRDIMMs							
1024 GB	64GB TruDDR4 (4Rx4, 1.2V) PC4-19200 PC4 2400MHz LP LRDIMM	16	Y	Y	Y	N	N

Selection option	Description	Quantity	HX3310	HX3310-F	HX3510-G	HX3710	HX3710-F
1536 GB	64GB TruDDR4 (4Rx4, 1.2V) PC4-19200 PC4 2400MHz LP LRDIMM	24	Y	Y	Y	N	N

* Not allowed for selection if the Intel Xeon processor E5-2698 v4 is selected.

The following table lists supported memory configurations and maximum operating speeds for the HX3310, HX3310-F, and HX3510-G appliances.

Note: Cells highlighted with a gray background indicate when the number of DIMMs per channel allows the DIMMs to operate faster than Intel specifications define, while still maintaining world-class reliability.

Table 10. HX3310, HX3310-F, and HX3510-G maximum memory speeds

Memory capacity	DIMMs per channel	Maximum memory speed	
		2133 MHz memory controller (E5-2620 v4, E5-2630 v4)	2400 MHz memory controller (E5-2650 v4, E5-2680 v4, E5-2697 v4, E5-2699 v4)
RDIMMs			
128 GB	1	2133 MHz	2400 MHz
256 GB	1	2133 MHz	2400 MHz
384 GB	3	1866 MHz	1866 MHz
512 GB	2	2133 MHz	2400 MHz
768 GB	3	1866 MHz	1866 MHz
LRDIMMs			
1024 GB	2	2133 MHz	2400 MHz
1536 GB	3	2133 MHz	2133 MHz

The following table lists supported memory configurations and maximum operating speeds for the HX3710 and HX3710-F appliances.

Table 11. HX3710 and HX3710-F maximum memory speeds

Memory capacity	DIMMs per channel	Maximum memory speed	
		2133 MHz memory controller (E5-2620 v2, E5-2630 v4)	2400 MHz memory controller (E5-2650 v4, E5-2680 v4, E5-2698 v4)
128 GB	1	2133 MHz	2400 MHz
256 GB	1	2133 MHz	2400 MHz
512 GB	2	2133 MHz	2133 MHz

Internal storage

The HX3000 Series appliances support the internal drive bay configurations listed in the following table.

Table 12. Internal drive bay configurations

Model	Hot-swap front drive bays (main storage)		Hypervisor boot drive	
	Quantity, form factor, drive types	Storage controller	Quantity, form factor, drive type	Storage controller
HX3310	8x 2.5-inch: 6x NL SATA HDDs + 2x SATA SSDs	1x N2215	1x Embedded 64 GB SSD (6 Gbps SATA DOM)	Onboard 6 Gbps SATA
HX3310-F	8x 2.5-inch: 8x SATA SSDs	1x N2215	1x Embedded 64 GB SSD (6 Gbps SATA DOM)	Onboard 6 Gbps SATA
HX3510-G	8x 2.5-inch: 8x SATA SSDs; or 6x NL SATA HDDs + 2x SATA SSDs	1x N2215	1x Embedded 64 GB SSD (6 Gbps SATA DOM)	Onboard 6 Gbps SATA
HX3710	6x 2.5-inch: 4x NL SATA HDDs + 2x SATA SSDs	1x H701-L	1x Embedded 64 GB SSD (6 Gbps SATA DOM)	Onboard 6 Gbps SATA
HX3710-F	6x 2.5-inch: 6x SATA SSDs	1x H701-L	1x Embedded 64 GB SSD (6 Gbps SATA DOM)	Onboard 6 Gbps SATA

The following table summarizes features of the storage controllers.

Table 13. Storage controller features and specifications summary

Feature	N2215	H701-L
Form factor	PCIe low profile	Mezzanine card
Controller chip	LSI SAS3008	LSI SAS2308
Host interface	PCIe 3.0 x8	PCIe 3.0 x8
Port interface	12 Gbps SAS	6 Gbps SAS
Number of ports	8	8*
Port connectors	2x Mini-SAS HD x4 (SFF-8643)	2x Mini-SAS x4 (SFF-8087)
Drive interface	SAS, SATA	SAS, SATA
Drive type	HDD, SSD	HDD, SSD
Drive form factor	SFF, LFF	SFF
RAID level	None	None (JBOD mode), 0, 1, 10
Cache	None	None

* The H701-L supports up to six drives.

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

Table 14. Hard drive options

Selection option	Description	Quantity	HX3310	HX3310-F	HX3510-G	HX3710	HX3710-F
Hard drives without encryption							
4 TB	1TB 7.2K 6Gbps NL SATA 2.5" G3HS HDD	4	N	N	N	Y	N
6 TB	1TB 7.2K 6Gbps NL SATA 2.5" G3HS HDD	6	Y	N	Y	N	N
8 TB	2TB 7.2K 6Gbps NL SATA 2.5" G3HS 512e HDD	4	N	N	N	Y	N
12 TB	2TB 7.2K 6Gbps NL SATA 2.5" G3HS 512e HDD	6	Y	N	Y	N	N
Self-encrypting hard drives							
8 TB	2TB 7.2K 12Gbps NL SAS 2.5'' G3HS 512e FIPS 140-2 SED	4	N	N	N	Y	N
12 TB	2TB 7.2K 12Gbps NL SAS 2.5'' G3HS 512e FIPS 140-2 SED	6	Y	N	Y	N	N

The following table lists the solid-state drive options that are available for selection.

Table 15. Solid-state drive options

Selection option	Description	Quantity	HX3310	HX3310-F	HX3510-G	HX3710	HX3710-F
Solid-state drives without encryption							
960 GB	Intel S3610 480GB Enterprise Mainstream SATA G3HS 2.5" SSD	2	Y	N	Y	Y	N
1600 GB	Intel S3610 800GB Enterprise Mainstream SATA G3HS 2.5" SSD	2	Y	N	Y	Y	N
2400 GB	Intel S3610 1.2TB Enterprise Mainstream SATA G3HS 2.5" SSD	2	Y	N	Y	Y	N
2880 GB	Intel S3610 480GB Enterprise Mainstream SATA G3HS 2.5" SSD	6	N	N	N	N	Y
3200 GB	Intel S3610 1.6TB Enterprise Mainstream SATA G3HS 2.5" SSD	2	Y	N	Y	Y	N
3840 GB	Intel S3610 480GB Enterprise Mainstream SATA G3HS 2.5" SSD	8	N	Y	Y	N	N
4800 GB	Intel S3610 800GB Enterprise Mainstream SATA G3HS 2.5" SSD	6	N	N	N	N	Y
6400 GB	Intel S3610 800GB Enterprise Mainstream SATA G3HS 2.5" SSD	8	N	Y	Y	N	N
7200 GB	Intel S3610 1.2TB Enterprise Mainstream SATA G3HS 2.5" SSD	6	N	N	N	N	Y
9600 GB	Intel S3610 1.2TB Enterprise Mainstream SATA G3HS 2.5" SSD	8	N	Y	Y	N	N
9600 GB	Intel S3610 1.6TB Enterprise Mainstream SATA G3HS 2.5" SSD	6	N	N	N	N	Y
12800 GB	Intel S3610 1.6TB Enterprise Mainstream SATA G3HS 2.5" SSD	8	N	Y	Y	N	N
30720 GB	PM1633a 3.84TB Enterprise Capacity 12Gb SAS G3HS 2.5" SSD	8	N	Y	Y	N	N
Self-encrypting solid-state drives							
800 GB	HGST SSC+ 400GB 12Gb SAS FIPS SED 3.5" Enterprise HS SSD	2	Y	N	Y	Y	N
1600 GB	HGST SSC+ 800GB 12Gb SAS FIPS SED 3.5" Enterprise HS SSD	2	Y	N	Y	Y	N
2400 GB	HGST SSC+ 400GB 12Gb SAS FIPS SED 3.5" Enterprise HS SSD	6	N	N	N	N	Y
3200 GB	HGST SSC+ 400GB 12Gb SAS FIPS SED 3.5" Enterprise HS SSD	8	N	Y	Y	N	N
3200 GB	HGST SSC+ 1.6TB 12Gb SAS FIPS SED 3.5" Enterprise HS SSD	2	Y	N	Y	Y	N
4800 GB	HGST SSC+ 800GB 12Gb SAS FIPS SED 3.5" Enterprise HS SSD	6	N	N	N	N	Y

Selection option	Description	Quantity	HX3310	HX3310-F	HX3510-G	HX3710	HX3710-F
6400 GB	HGST SSC+ 800GB 12Gb SAS FIPS SED 3.5" Enterprise HS SSD	8	N	Y	Y	N	N
9600 GB	HGST SSC+ 1.6TB 12Gb SAS FIPS SED 3.5" Enterprise HS SSD	6	N	N	N	N	Y
12800 GB	HGST SSC+ 1.6TB 12Gb SAS FIPS SED 3.5" Enterprise HS SSD	8	N	Y	Y	N	N

Note: Self-encrypting drives and drives without encryption (HDDs and SSDs) cannot be intermixed in the same appliance, that is, all drives in the appliance (HDDs and SSDs) should be either self-encrypting or without encryption.

Network connectivity

The Lenovo Converged HX3310, HX3310-F, and HX3510-G appliances provide two- or four-port 10 GbE network connectivity by selecting one or two Intel X520 adapters that provide two 10 GbE ports with SFP+ connectors each, or Intel X550-T2 adapters that provides two 10 GbE ports with RJ-45 connectors each.

10 GbE ports are bonded with the 1 GbE ports on the system board. The onboard 1 GbE network interface controller (NIC) that is based on the Broadcom BCM5719 chip provides four 10/100/1000 Mb Ethernet ports with RJ-45 connectors.

The Lenovo Converged HX3710 and HX3710-F appliances provide two-port 10 GbE network connectivity. The Intel X520 10 GbE mezzanine card that is based on the Intel 82599 NIC chip provides two 10 GbE ports with SFP+ connectors. Alternatively, two-port 10 GbE network connectivity can be configured by selecting the Intel X550-T2 PCIe adapter that provides two 10 GbE ports with RJ-45 connectors.

The following table lists the 10 GbE network adapter options that are available for selection.

Note: The Intel X520 and X550-T2 adapters cannot be intermixed in the same appliance, that is, either X520 or X550-T2 adapters can be selected for the appliance, but not both adapter types.

Table 16. Network adapter options

Description	Quantity (min / max)	HX3310	HX3310-F	HX3510-G	HX3710	HX3710-F
Intel X520 Dual Port 10GbE SFP+ OCP Mezz (SFP+ connectors)	1 / 1	N	N	N	Y	Y
Intel X520 Dual Port 10GbE SFP+ Adapter (SFP+ connectors)	1 / 2	Y	Y	Y	N	N
Intel X550-T2 Dual Port 10GBase-T Adapter (RJ-45 connectors)	1 / 2*	Y	Y	Y	Y*	Y*

* The maximum number of adapters supported in the HX3710 or HX3710-F appliances is one.

The following table summarizes features of the 10 GbE network adapters.

Table 17. 10 GbE network adapter features and specifications summary

Feature	X520	X550-T2
Form factor	PCIe low profile or OCP Mezzanine	PCIe low profile
Controller chip	Intel 82559	Intel X550
Host interface	PCIe 2.0 x8	PCIe 3.0 x4
Port interface	10 GbE	10 GbE
Number of ports	2	2
Port connector	SFP+	RJ-45

Feature	X520	X550-T2
Port speeds	10 Gbps	100 Mbps, 1 Gbps, 10 Gbps

The SFP+ adapters require SFP+ transceivers or direct-attach copper (DAC) cables that must be ordered separately (two SFP+ transceivers or DAC cables per adapter). The following table lists supported SFP+ transceiver and cable options.

Table 18. SFP+ transceivers and cable options

Description	Part number	Feature code	Quantity per adapter
SFP+ transceivers - 10 GbE			
Lenovo 10GBASE-SR SFP+ Transceiver	46C3447	5053	2
QLogic 10Gb SFP+ SR Optical Transceiver	49Y4218	0064	2
Optical cables for 10 GbE SFP+ SR transceivers			
Lenovo 0.5m LC-LC OM3 MMF Cable	00MN499	ASR5	2
Lenovo 1m LC-LC OM3 MMF Cable	00MN502	ASR6	2
Lenovo 3m LC-LC OM3 MMF Cable	00MN505	ASR7	2
Lenovo 5m LC-LC OM3 MMF Cable	00MN508	ASR8	2
Lenovo 10m LC-LC OM3 MMF Cable	00MN511	ASR9	2
Lenovo 15m LC-LC OM3 MMF Cable	00MN514	ASRA	2
Lenovo 25m LC-LC OM3 MMF Cable	00MN517	ASRB	2
Lenovo 30m LC-LC OM3 MMF Cable	00MN520	ASRC	2
SFP+ passive direct-attach cables - 10 GbE			
Lenovo 0.5m Passive SFP+ DAC Cable	00D6288	A3RG	2
Lenovo 1m Passive SFP+ DAC Cable	90Y9427	A1PH	2
Lenovo 1.5m Passive SFP+ DAC Cable	00AY764	A51N	2
Lenovo 2m Passive SFP+ DAC Cable	00AY765	A51P	2
Lenovo 3m Passive SFP+ DAC Cable	90Y9430	A1PJ	2
Lenovo 5m Passive SFP+ DAC Cable	90Y9433	A1PK	2
Lenovo 7m Passive SFP+ DAC Cable	00D6151	A3RH	2

GPU adapters

The HX3510-G appliance supports GPU adapter selection options listed in the following table.

Table 19. GPU adapter selection options

Description	Quantity (min / max)	HX3310	HX3310-F	HX3510-G	HX3710	HX3710-F
NVidia Tesla M60 GPU, PCIe (active)	2 / 2	N	N	Y	N	N

Hypervisors

The Lenovo Converged HX3000 Series appliances support the following hypervisors:

- Nutanix Acropolis Hypervisor (AHV)
- VMware ESXi 5.5 Update 3
- VMware ESXi 6.0 Update 1
- VMware ESXi 6.0 Update 2
- Microsoft Windows Server 2012 R2 DataCenter Edition (Hyper-V)

Notes:

- The HX Series appliances ship with Nutanix AHV (default) or VMware ESXi (optional) preloaded.
- Microsoft Hyper-V is supported as a field-installable option only.

Software

The Lenovo Converged HX3000 Series appliances can be configured with one of the Nutanix Software editions that are listed in the following table. The Starter edition is factory-preloaded and the appropriate license can be downloaded from the Nutanix website to match the serial number of the appliance.

Table 20. Nutanix software options

Description	Quantity
Nutanix Starter Edition	1
Nutanix Pro Edition (default selection)	1
Nutanix Ultimate Edition	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.

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

Table 21. Nutanix software upgrade options

Description	Part number
Nutanix Starter to Pro Upgrade	01GU985
Nutanix Starter to Ultimate Upgrade	01GU986
Nutanix Pro to Ultimate Upgrade	01GU987

Configuration note: You 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.

The following table compares features of the Nutanix software editions.

Table 22. Nutanix software editions feature comparison

	Nutanix software edition		
Feature	**Starter**	**Pro**	**Ultimate**
Enterprise storage			
Cluster size	12 nodes max	Unlimited	Unlimited
Heterogeneous clusters	Yes	Yes	Yes
VM-centric snapshots and clones	Yes	Yes	Yes
Volume groups	Yes	Yes	Yes
Data tiering	Yes	Yes	Yes
Online cluster grow/shrink	Yes	Yes	Yes
Acropolis container services	Yes	Yes	Yes
Inline compression	Yes	Yes	Yes
Inline performance deduplication	Yes	Yes	Yes
MapReduce compression	No	Yes	Yes
MapReduce deduplication	No	Yes	Yes
Erasure Coding (EC-X)	No	Yes	Yes
Acropolis block services	No	Yes	Yes
Acropolis file services	No	No	Yes
VM Flash Mode (Pin to SSD)	No	No	Yes
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
Time Stream (Converged local backups)	Yes	Yes	Yes
VSS integration	No	Yes	Yes
Cloud Connect (Backup to public clouds)	No	Yes	Yes
Self-service restore	No	Yes	Yes
Multiple site DR (many to many)	No	No	Yes
Metro availability	No	No	Yes
Synchronous replication and disaster recovery	No	No	Yes
Security			
Client authentication	Yes	Yes	Yes
Cluster lockdown	No	Yes	Yes
Data-at-rest encryption	No	No	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

Feature	Nutanix software edition		
	Starter	**Pro**	**Ultimate**
One-click upgrades (Nutanix OS and Hypervisor)	Yes	Yes	Yes
Rest APIs	No	Yes	Yes
Virtualization			
VMware vSphere support	Yes	Yes	Yes
Microsoft Hyper-V support	Yes	Yes	Yes
Built-in Acropolis Hypervisor	Yes	Yes	Yes
VM operations	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

* Data-at-rest encryption requires self-encrypting drives (SEDs).

Systems management

The Lenovo Converged HX3310, HX3310-F, and HX3510-G appliances support the following systems management tools:

- Integrated Management Module
- Light path diagnostics
- Lenovo XClarity
- Nutanix Prism
- Lenovo XClarity Energy Manager

The Lenovo Converged HX3710 and HX3710-F appliances support the following systems management tools:

- ThinkServer Management Module
- Lenovo XClarity
- Nutanix Prism

Integrated Management Module (HX3310, HX3310-F, HX3510-G)

The Lenovo Converged HX3310, HX3310-F, and HX3510-G appliances contain Integrated Management Module II (IMM2.1), which provides advanced service-processor control, monitoring, and an alerting function. If an environmental condition exceeds a threshold or if a system component fails, the IMM2 lights LEDs to help you diagnose the problem, records the error in the event log, and alerts you to the problem. The Integrated Management Module Advanced Upgrade comes standard with the appliances, and it provides a virtual presence for remote management capabilities of the appliances.

The IMM provides remote appliance management through industry-standard interfaces:

- Intelligent Platform Management Interface (IPMI) Version 2.0
- Simple Network Management Protocol (SNMP) Version 3
- Common Information Model (CIM)
- Web browser

The remote presence feature provides the following functions:

- Remotely viewing video with graphics resolutions up to 1600x1200 at 75 Hz with up to 23 bits per pixel colors, regardless of the system state
- Remotely accessing the appliance using the keyboard and mouse from a remote client
- Mapping the CD or DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the appliance
- Uploading a diskette image to the IMM memory and mapping it to the appliance as a virtual drive

ThinkServer Management Module (HX3710, HX3710-F)

The Lenovo Converged HX3710 and HX3710-F appliances have an integrated ThinkServer Management Module (TMM), also known as a baseboard management controller (BMC), for configuration, systems management, and remote control.

The remote presence (remote KVM and media) is a standard function of the TMM. The remote presence feature provides the following functions:

- Remotely viewing video with graphics resolutions up to 1024 x 768, regardless of the system state
- Remotely accessing the server, using the keyboard and mouse from a remote client
- Mapping the CD or DVD drive, diskette drive, and USB flash drive on a remote client, and mapping ISO and diskette image files as virtual drives that are available for use by the server
- Uploading a diskette image to the TMM memory and mapping it to the server as a virtual drive

The HX3710 and HX3710-F appliances also support IPMI 2.0 for out-of-band management through the dedicated RJ-45 systems management port. Supported interfaces include:

- Command-line interface (IPMI Shell)
  The command-line interface provides direct access to server management functions through the IPMI 2.0 protocol. Use the command-line interface to issue commands to control the server power, view system information, and identify the server. You can also save one or more commands as a text file and run the file as a script.
- Serial over LAN
  Establish a Serial over LAN (SOL) connection to manage servers from a remote location. You can remotely view and change the UEFI settings, restart the server, identify the server, and perform other management functions. Any standard Telnet client application can access the SOL connection.

Light path diagnostics (HX3310, HX3310-F, HX3510-G)

The Lenovo Converged HX3310, HX3310-F, and HX3510-G appliances include basic light path diagnostics, which includes system LEDs on the front of the appliance and LEDs near the monitored components (for example, the DIMM error LED on the system board).

The Lenovo Converged HX3310, HX3310-F, and HX3510-G appliances also include a next-gen light path diagnostics LCD display panel. With LCD display, customers have quick access to system status, firmware, network, and health information.

Lenovo XClarity

Lenovo XClarity is a centralized systems management solution that helps administrators deliver infrastructure faster. This solution integrates easily with Lenovo System x M5 and X6 rack servers, Converged HX Series appliances, and Flex System, providing automated agent-less discovery, monitoring, firmware updates, configuration management, and bare metal deployment of operating systems and hypervisors across multiple systems.

Lenovo XClarity is an optional software component for the Lenovo Converged 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 and XClarity Integrators for the duration of the selected warranty period. If Lenovo XClarity software support is required, the XClarity Pro option must be selected.
- For the HX3710 and HX3710-F, Lenovo XClarity only supports discovery, inventory, and monitoring. Other functions, including firmware updates and secure connectivity, are not supported.

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

- Auto-discovery, inventory, and monitoring of Converged 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

In addition, Lenovo XClarity Administrator offers two software plug-in modules (Lenovo XClarity Integrators) at no charge:

- Lenovo XClarity Integrator for Microsoft System Center
- Lenovo XClarity Integrator for VMware vCenter

Lenovo XClarity Integrators allow administrators to manage physical infrastructure from leading external virtualization management software tools from Microsoft and VMware.

Note: The HX3710 and HX3710-F appliances do not support Lenovo XClarity Integrators.

Lenovo XClarity Integrators offer the following additional features:

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

Nutanix Prism

Nutanix Prism gives administrators a simple and elegant way to manage virtual environments. Powered by advanced data analytics and heuristics, Prism simplifies and streamlines common workflows within a datacenter eliminating the need to have disparate management solutions.

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 selected during the initial purchase. 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 23. Prism Pro software license options

Description	Part number	Quantity
Nutanix Prism Pro with 1Yr Support	01GU988	1
Nutanix Prism Pro with 2Yr Support	01GU989	1
Nutanix Prism Pro with 3Yr Support	01GU990	1
Nutanix Prism Pro with 4Yr Support	01GU991	1
Nutanix Prism Pro with 5Yr Support	01GU992	1

Configuration note: You should request a quote for the selected Prism Pro part number 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
- 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

Lenovo XClarity Energy Manager (HX3310, HX3310-F, HX3510-G)

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. 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:

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

Lenovo XClarity Energy Manager is an optional, separately orderable software component for the Lenovo Converged HX Series appliances that is licensed on a per managed node basis; that is, each managed system requires a license.

The following table lists the geo-specific Lenovo XClarity Energy Manager software license options.

Note: Lenovo XClarity Energy Manager does not support HX3710 and HX3710-F appliances.

Table 24. Lenovo XClarity Energy Manager software options

Description	Part number (NA, AP, Japan)*	Part number (EMEA, LA)**
Lenovo XClarity Energy Manager, 1 Node w/ 1 Yr S&S	01DA225	01DA228
Lenovo XClarity Energy Manager, 5 Nodes w/ 1 Yr S&S	01DA226	01DA229
Lenovo XClarity Energy Manager, 50 Nodes w/ 1 Yr S&S	01DA227	01DA230

* NA = North America; AP = Asia Pacific
** EMEA = Europe, Middle East, Africa; LA = Latin America

Physical specifications

The Lenovo Converged HX3310 and HX3310-F appliances have the following dimensions and weight (approximate):

- Height: 43 mm (1.7 in.)
- Width: 434 mm (17.1 in.)
- Depth: 734 mm (28.9 in.)
- Weight (maximum): 19.3 kg (42.5 lb)

The Lenovo Converged HX3510-G appliances have the following dimensions and weight (approximate):

- Height: 87 mm (3.4 in.)
- Width: 446 mm (17.5 in.)
- Depth: 800 mm (31.5 in.)
- Weight (maximum): 34 kg (75 lb)

The Lenovo Converged HX3710 and HX3710-F appliances have the following dimensions and weight (approximate):

- Enclosure
  - Height: 87 mm (3.4 in.)
  - Width: 442 mm (17.4 in.)
  - Depth: 835 mm (32.9 in.)
  - Weight (maximum): 36.9 kg (81 lb)
- Node
  - Height: 41 mm (1.6 in.)
  - Width: 216 mm (8.5 in.)
  - Depth: 659 mm (25.9 in.)
  - Weight (maximum): 6.2 kg (13.6 lb)

Operating environment

The HX3310, HX3310-F, and HX3510-G appliances are supported in the following environment:

- Air temperature:
  - System on: 5 °C to 40 °C (41 °F to 104 °F); altitude: 0 to 950 m (3,117 ft); decrease the maximum system temperature by 1 °C for every 175-m increase in altitude above 950 m.
  - System off: 5 °C to 45 °C (41 °F to 113 °F)
  - Shipment: -40 °C to +60 °C (-40 °F to 140 °F) at up to 10,700 m (35,105 ft)
- Maximum altitude: 3,050 m (10,000 ft) at 5 °C to 28 °C (41 °F to 82 °F)

- Humidity:
  - System on: 8% to 85%, maximum dew point 24 °C, maximum rate of change 5 °C/hr
  - System off: 8% to 85%, maximum dew point 27 °C
- Design to ASHRAE Class A3, ambient of 36 °C to 40 °C (96.8 °F to 104 °F), with relaxed support:
  - Supports cloud-like workload with no performance degradation acceptable (Turbo-Off).
  - Under no circumstance can any combination of worst-case workload and configuration result in system shutdown or design exposure at 40 °C.
  - The worst-case workload (like Linpack, Turbo-On) might have performance degradation.
- Electrical:
  - HX3310 and HX3310-F:
    - 100 to 127 (nominal) V AC; 50 Hz or 60 Hz; 10.4 A
    - 200 to 240 (nominal) V AC; 50 Hz or 60 Hz; 5.0 A
    - Input kilovolt-amperes (kVA) (approximately): 1.192 kVA
  - HX3510-G:
    - 200 to 240 (nominal) V AC; 50 Hz or 60 Hz; 7.2 A
    - Input kilovolt-amperes (kVA) (approximately): 1.671 kVA
- BTU output (maximum):
  - HX3310 and HX3310-F: 4026 Btu/hr (1180 watts)
  - HX3510-G: 5643 Btu/hr (1654 watts)
- Noise level:
  - 6.6 bels (operating)
  - 6.4 bels (idle)

The HX3710 and HX3710-F appliances are supported in the following environment:

- Air temperature:
  - System on: 10 °C to 35 °C (50 °F to 95 °F); altitude: 0 to 950 m (3,117 ft); decrease the maximum system temperature by 1 °C for every 300-m increase in altitude above 950 m.
  - System off: 5 °C to 45 °C (41 °F to 113 °F)
  - Shipment: -40 °C to +60 °C (-40 °F to 140 °F) at up to 10,700 m (35,105 ft)
- Maximum altitude: 3,050 m (10,000 ft) at 10 °C to 28 °C (50 °F to 82 °F)
- Humidity:
  - System on: 20% to 80%, maximum dew point 21 °C (70 °F), maximum rate of change 20 °C/hr
  - System off: 8% to 80%, maximum dew point 27 °C (80.6°F)
  - Shipment: 5% to 100%, maximum dew point 29 °C (84.2°F)
- Electrical:
  - 200 to 240 (nominal) V AC; 50 Hz or 60 Hz; 9.6 A
  - Input kilovolt-amperes (kVA) (approximately): 1.916 kVA
- BTU output (maximum): 6473 Btu/hr (1897 watts)
- Noise level:
  - 6.8 bels (operating)
  - 6.2 bels (idle)

Regulatory compliance

The Lenovo Converged HX3000 Series appliances conform to the following regulations:

- AS/NZS CISPR 22, Class A (Australia/New Zealand)
- BSMI CNS 13438, Class A; CNS 14336 (Taiwan)
- CCC GB 4943.1, GB 17625.1, GB 9254 Class A (China)
- CE Mark (European Union)
- CISPR 22, Class A
- EAC (Russia)
- EN 55022, Class A
- EN 55024
- EN/IEC 61000-3-2
- EN/IEC 61000-3-3
- EN/IEC/CSA/UL 60950-1
- Energy Star 2.0
- FCC Part 15, Class A (United States)
- GS/TUV (Germany)
- ICES-003/NMB-03, Class A (Canada)
- MSIP (Korea)
- NOM-019 (Mexico)
- Reduction of Hazardous Substances (ROHS)
- TUV S (Argentina)
- VCCI, Class A (Japan)

Hardware warranty

The Lenovo Converged HX3000 Series appliances can be configured with a three-year or five-year hardware warranty and software support with standard call center support 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.

Note: Lenovo warranty service coverage levels are region-specific. Not all warranty service levels are available in every region.

The following table explains warranty service definitions in more detail.

Table 25. Warranty service definitions

Term	Description
Onsite Service	If a problem with your product cannot be resolved via telephone, a Service Technician will be dispatched to arrive at your location.
Parts Delivered	If a problem with your product cannot be resolved via telephone and a CRU part is required, Lenovo will send a replacement CRU to arrive at your location. If a problem with your product cannot be resolved via telephone and a FRU part is required, a Service Technician will be dispatched to arrive at your location.
Technician Installed Parts	If a problem with your product cannot be resolved via telephone, a Service Technician will be dispatched to arrive at your location.
Hours of coverage	• 9x5: 9 hours per day, 5 days per week, during normal business hours, excluding local public and national holidays • 24x7: 24 hours per day, 7 days per week, 365 days per year.
Response time target	2 hours, 4 hours, or Next Business Day: The time period from when the telephone based troubleshooting is completed and logged, to the delivery of the CRU or arrival of a Service Technician and part at the Customer's location for repair.
Committed Repair	6 hours: The time period between the service request registration in Lenovo's call management system and the restoration of the product to conformance with its specification by a Service Technician.

In general, the following Lenovo warranty service levels are available for the Converged HX Series appliances:

- Three or five years of 9x5 or 24x7 service coverage
- Parts delivered or technician installed parts from next business day to 4 or 2 hours
- Committed Service Repair
  Committed Service Repair (CSR) enhances the level of Warranty Service Upgrade or Post Warranty/Maintenance Service offering associated with the selected systems. Offerings vary and are available in select regions.
    - Priority handling to meet defined time frames to restore the failing machine to good working condition
    - 24x7x6 committed repair: Service performed 24 hours per day, 7 days per week, within 6 hours
- YourDrive YourData
  Lenovo's YourDrive YourData service is a multi-drive retention offering that ensures your data is always under your control, regardless of the number of drives that are installed in your Lenovo server. In the unlikely event of a drive failure, you retain possession of your drive while Lenovo replaces the failed drive part. Your data stays safely on your premises, in your hands. The YourDrive YourData service can be purchased in convenient bundles with Lenovo warranty upgrades and extensions.

Software maintenance

The Lenovo Converged HX3000 Series appliances include a three-year or five-year software support and subscription (matches the duration of the selected hardware warranty period) that entitles you 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): 2 hours
- Priority 2 (Critical: Significant impact on productivity): 4 hours
- Priority 3 (Normal: Minimal impact on productivity): 8 hours (by next business day)

Ethernet LAN switches

The following table lists the Ethernet LAN switches that are offered by Lenovo that can be used in Lenovo Converged HX Series solutions.

Table 26. Ethernet LAN switches

Description	Part number	Feature code
1 Gb Ethernet switches (IPMI management and 1 GbE host connectivity)		
Lenovo RackSwitch G7028 (Rear to Front)	7159BAX	AT09
Lenovo RackSwitch G7052 (Rear to Front)	7159CAX	AT0A
Lenovo RackSwitch G8052 (Rear to Front)	7159G52	ASY2
10 Gb Ethernet switches (10 GbE host connectivity)		
Lenovo ThinkSystem NE1032 RackSwitch (Rear to Front)	7159A1X	AU3A
Lenovo ThinkSystem NE1032T RackSwitch (Rear to Front)	7159B1X	AU38
Lenovo ThinkSystem NE1072T RackSwitch (Rear to Front)	7159C1X	AU36
Lenovo RackSwitch G8124E (Rear to Front)	7159BR6	AT0B
Lenovo RackSwitch G8272 (Rear to Front)	7159CRW	ASRD
Lenovo RackSwitch G8296 (Rear to Front)	7159GR6	ASVM
40 Gb Ethernet switches (40 GbE aggregation layer; 10 GbE breakout host connectivity)		
Lenovo RackSwitch G8332 (Rear to Front)	7159BRX	ASY4
100 Gb Ethernet switches (40 GbE/100 GbE aggregation layer; 10 GbE breakout host connectivity)		
Lenovo ThinkSystem NE10032 RackSwitch (Rear to Front)	7159D1X	AV17

For more information, see the list of Product Guides in the Top-of-rack Switches category:
http://lenovopress.com/servers/options/switches

Rack cabinets

The following table lists the rack cabinets that are offered by Lenovo that can be used in Lenovo Converged HX Series solutions.

Table 27. Rack cabinets

Description	Part number	Feature code
25U S2 Standard Rack (1000 mm deep; 2 sidewall compartments)	93072RX	1042
25U Static S2 Standard Rack (1000 mm deep; 2 sidewall compartments)	93072PX	6690
42U S2 Standard Rack (1000 mm deep; 6 sidewall compartments)	93074RX	1043
42U 1100mm Enterprise V2 Dynamic Rack (6 sidewall compartments)	93634PX	A1RC
42U 1100mm Enterprise V2 Dynamic Expansion Rack (6 sidewall compartments)	93634EX	A1RD
42U 1200mm Deep Dynamic Rack (6 sidewall compartments)	93604PX	7649
42U 1200mm Deep Static Rack (6 sidewall compartments)	93614PX	7651
42U Enterprise Rack (1105 mm deep; 4 sidewall compartments)	93084PX	5621
42U Enterprise Expansion Rack (1105 mm deep; 4 sidewall compartments)	93084EX	5622

For more information, see the list of Product Guides in the Rack Cabinets category:
http://lenovopress.com/servers/options/racks

Power distribution units

The following table lists the power distribution units (PDUs) that are offered by Lenovo that can be used in Lenovo Converged HX Series solutions.

Table 28. Power distribution units

Description	Part number	Feature code
0U Basic PDUs		
0U 36 C13/6 C19 24A/200-240V 1 Phase PDU with NEMA L6-30P line cord	00YJ776	ATZY
0U 36 C13/6 C19 32A/200-240V 1 Phase PDU with IEC60309 332P6 line cord	00YJ777	ATZZ
0U 21 C13/12 C19 32A/200-240V/346-415V 3 Phase PDU with IEC60309 532P6 cord	00YJ778	AU00
0U 21 C13/12 C19 48A/200-240V 3 Phase PDU with IEC60309 460P9 line cord	00YJ779	ATZX
Switched and Monitored PDUs		
0U 20 C13/4 C19 Switched and Monitored 24A/200-240V/1Ph PDU w/ NEMA L6-30P cord	00YJ781	AU03
0U 20 C13/4 C19 Switched / Monitored 32A/200-240V/1Ph PDU w/ IEC60309 332P6 cord	00YJ780	AU01
0U 18 C13/6 C19 Sw. / Mon. 32A/200-240/346-415V/3Ph PDU w/ IEC60309 532P6 cord	00YJ782	AU02
0U 12 C13/12 C19 Switched / Monitored 48A/200-240V/3Ph PDU w/ IEC60309 460P9 cord	00YJ783	AU04
1U 9 C19/3 C13 Switched and Monitored DPI PDU (without line cord)	46M4002	5896
1U 9 C19/3 C13 Switched and Monitored 60A 3Ph PDU with IEC 309 3P+Gnd cord	46M4003	5897
1U 12 C13 Switched and Monitored DPI PDU (without line cord)	46M4004	5894
1U 12 C13 Switched and Monitored 60A 3 Phase PDU with IEC 309 3P+Gnd line cord	46M4005	5895
Ultra Density Enterprise PDUs (9x IEC 320 C13 + 3x IEC 320 C19 outlets)		
Ultra Density Enterprise C19/C13 PDU Module (without line cord)	71762NX	6050

Description	Part number	Feature code
Ultra Density Enterprise C19/C13 PDU 60A/208V/3ph with IEC 309 3P+Gnd line cord	71763NU	6051
C13 Enterprise PDUs (12x IEC 320 C13 outlets)		
DPI C13 Enterprise PDU+ (without line cord)	39M2816	6030
DPI Single Phase C13 Enterprise PDU (without line cord)	39Y8941	6010
C19 Enterprise PDUs (6x IEC 320 C19 outlets)		
DPI Single Phase C19 Enterprise PDU (without line cord)	39Y8948	6060
DPI 60A 3 Phase C19 Enterprise PDU with IEC 309 3P+G (208 V) fixed line cord	39Y8923	6061
Front-end PDUs (3x IEC 320 C19 outlets)		
DPI 30amp/125V Front-end PDU with NEMA L5-30P line cord	39Y8938	6002
DPI 30amp/250V Front-end PDU with NEMA L6-30P line cord	39Y8939	6003
DPI 32amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8934	6005
DPI 60amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8940	6004
DPI 63amp/250V Front-end PDU with IEC 309 2P+Gnd line cord	39Y8935	6006
Universal PDUs (7x IEC 320 C13 outlets)		
DPI Universal 7 C13 PDU (with 2 m IEC 320-C19 to C20 rack power cord)	00YE443	5950
NEMA PDUs (6x NEMA 5-15R outlets)		
DPI 100-127V PDU with fixed NEMA L5-15P line cord	39Y8905	5900
Line cords for PDUs that ship without a line cord		
DPI 30a Line Cord (NEMA L6-30P)	40K9614	6500
DPI 32a Line Cord (IEC 309 P+N+G)	40K9612	6502
DPI 32a Line Cord (IEC 309 3P+N+G)	40K9611	6504
DPI 60a Cord (IEC 309 2P+G)	40K9615	6501
DPI 63a Cord (IEC 309 P+N+G)	40K9613	6503
DPI Australian/NZ 3112 Line Cord (32A)	40K9617	6505
DPI Korean 8305 Line Cord (30A)	40K9618	6506

For more information, see the list of Product Guides in the Power Distribution Units category:
http://lenovopress.com/servers/options/pdu

Uninterruptible power supply units

The following table lists the uninterruptible power supply (UPS) units that are offered by Lenovo that can be used in Lenovo Converged HX Series solutions.

Table 29. Uninterruptible power supply units

Description	Part number	Feature code
RT1.5kVA 2U Rack or Tower UPS (100-125VAC) (8x NEMA 5-15R 12A outlets)	55941AX	A53S
RT1.5kVA 2U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A outlets)	55941KX	A53T
RT2.2kVA 2U Rack or Tower UPS (100-125VAC) (8x NEMA 5-20R 16A outlets)	55942AX	A53U
RT2.2kVA 2U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 1x C19 16A outlets)	55942KX	A53V
RT3kVA 2U Rack or Tower UPS (100-125VAC) (6x NEMA 5-20R 16A, 1x L5-30R 24A outlets)	55943AX	A53W
RT3kVA 2U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 1x C19 16A outlets)	55943KX	A53X
RT5kVA 3U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 2x C19 16A outlets)	55945KX	A540
RT6kVA 3U Rack or Tower UPS (200-240VAC) (8x IEC 320 C13 10A, 2x C19 16A outlets)	55946KX	A541
RT8kVA 6U Rack or Tower UPS (200-240VAC) (4x IEC 320-C19 16A outlets)	55948KX	A543
RT11kVA 6U Rack or Tower UPS (200-240VAC) (4x IEC 320-C19 16A outlets)	55949KX	A544
RT8kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC) (4x IEC 320-C19 16A outlets)	55948PX	A546
RT11kVA 6U 3:1 Phase Rack or Tower UPS (380-415VAC) (4x IEC 320-C19 16A outlets)	55949PX	A547

For more information, see the list of Product Guides in the Uninterruptible Power Supply Units category: http://lenovopress.com/servers/options/ups

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Related publications and links

For more information, see these resources:

- Lenovo Converged HX Series appliances product page
  http://www3.lenovo.com/us/en/p/WMD00000036
- Lenovo Enterprise Solutions Configurator (LESC):
  http://lesc.lenovo.com
- System x and Cluster Solutions Configurator (x-config)
  http://lesc.lenovo.com/products/hardware/configurator/worldwide/bhui/asit/
- Nutanix documentation
  http://portal.nutanix.com/#/page/docs
- Lenovo Data Center Support
  http://datacentersupport.lenovo.com
- Lenovo Converged HX Series TCO Calculator
  http://lenovo-hx.esgcalculator.com
- Lenovo Hyperconverged Decision Tool
  http://www.lenovo.com/hxdecisiontool

Related product families

Product families related to this document are the following:

- Hyperconverged Infrastructure
- Nutanix Alliance
- ThinkAgile HX Series for Nutanix

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