Lenovo ThinkAgile SX for Nutanix (SXN3000)

Product Guide (withdrawn product)

Lenovo ThinkAgile SX for Nutanix delivers a turnkey, pre-integrated, easy-to-deploy rack-level solution that dramatically reduces time-to-value and provides a seamless end-to-end customer experience. The solution is based on Lenovo ThinkAgile HX Series appliances that combine industry-leading hyperconvergence software from Nutanix with Lenovo ThinkSystem enterprise platforms.

ThinkAgile SX for Nutanix integrates Lenovo networking, ThinkAgile HX appliances, and management, and the solution is pre-tested, factory configured, and is delivered ready to go (up to 60% of the steps that are typically done onsite are automated in the factory). Starting with four nodes to keep acquisition costs down, the ThinkAgile SX for Nutanix is capable of immense scalability as business needs grow. Customers can also mix and match different models of ThinkAgile HX appliances.

Figure 1. Lenovo ThinkAgile SX for Nutanix

Suggested workloads for the ThinkAgile SX for Nutanix include virtual desktop infrastructure (VDI), server virtualization, private/hybrid clouds, enterprise applications, and high performance databases.

Did you know?

The ThinkAgile SX for Nutanix is built on ThinkAgile HX Series appliances that feature enterprise-class reliability, management, and security, and they deliver the industry's most feature-rich hyperconverged infrastructure to enterprise datacenters.

The ThinkAgile SX for Nutanix ships fully integrated into a 42U or 25U rack cabinet, tested, configured, and ready to be plugged in and turned on; it is designed to integrate into an existing infrastructure effortlessly, to dramatically accelerate time to value and reduce infrastructure maintenance costs.

Lenovo provides ThinkAgile Advantage lifecycle management with a single point of support for the entire ThinkAgile SX for Nutanix solution with the nodes, networking, and software components, for quicker problem determination and minimized downtime.

Key features

Lenovo ThinkAgile SX for Nutanix integrates Lenovo networking, ThinkAgile HX appliances, and premier, easy-to-use management to administer the infrastructure as a single system. It is designed with industry-standard software defined building blocks: Nutanix hyperconverged software loaded on powerful and highly reliable Lenovo ThinkSystem servers.

The ThinkAgile SX for Nutanix solution offers the following key features:

- Scalable configurations of a complete on-premises hyperconverged platform designed to optimize your workload's performance to provide the IT agility your business demands.
- Factory-integrated, pre-configured ready-to-go solution that is delivered in a rack with all the software and hardware you need for your workloads: hyperconverged appliances, network switches, plus essential management tools.
- Designed for effortless integration into existing infrastructures, thereby reducing deployment time and saving money.
- Lenovo ThinkAgile Advantage deployment services that are included with the solution help get customers up and running quickly by allowing to begin deploying workloads in hours — not weeks — and realize substantial savings.
- Proven and reliable ThinkAgile HX Series appliances featuring Intel Xeon Processor Scalable Family provide compute power for a variety of workloads and applications.
- The HX Series appliances deliver enterprise data storage as an on-demand service by employing highly distributed software architecture to provide a rich set of software-defined services that are entirely VM-centric, including snapshots, high availability, disaster recovery, deduplication and more.
    - Nutanix software offers a natively integrated solution for data protection and continuous availability at VM granularity and gives administrators an affordable range of options to meet the recovery point objectives (RPO) and recovery time objectives (RTO) for different applications.
    - The Nutanix platform is fault resistant, 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, and is built to detect, isolate and recover from failures anywhere in the system.
    - The Nutanix platform combines web-scale capabilities with 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.
    - 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.
- Lenovo ThinkSystem Ethernet switches deliver exceptional performance and low latency, along with cost savings, and are designed to perform seamlessly with other vendors' upstream switches.
- The ThinkAgile Network Orchestrator feature of Lenovo Cloud Networking Operating System (CNOS) running on the Lenovo Ethernet switches gives increased visibility of the virtual infrastructure, including VM and virtual network information. It provides automated VM-aware provisioning by automatically configuring VLANs in the physical network based on the auto-discovered virtual network topology and performs ongoing dynamic updates to the physical network configuration in response to changes to the virtual network (for example, adding, updating, or deleting VMs and virtual networks).
- Powerful tools to manage both hardware and applications that come integrated into the ThinkAgile SX for Nutanix solution simplify and automate the management of the entire solution, allowing you to manage the infrastructure as a single system, rather than as individual components.

- Enables you to centrally manage virtual and physical resource pools, eliminate planned and unplanned workload downtime related to physical hosts, and avoid disruption and wasted time with predictive analytics across the application-to-infrastructure topology, for a more efficient data center and increased productivity.
- All the components of the solution are available through Lenovo, which provides ThinkAgile Advantage with a single point of support for all issues that you might encounter with the switches, software defined appliances, and software used in the solution, for quicker problem determination and minimized downtime.

Components

ThinkAgile SX for Nutanix is offered in two models: ThinkAgile SXN3000 42U and ThinkAgile SXN3000 25U.

The front and rear views of the ThinkAgile SXN3000 42U are shown in the following figure.

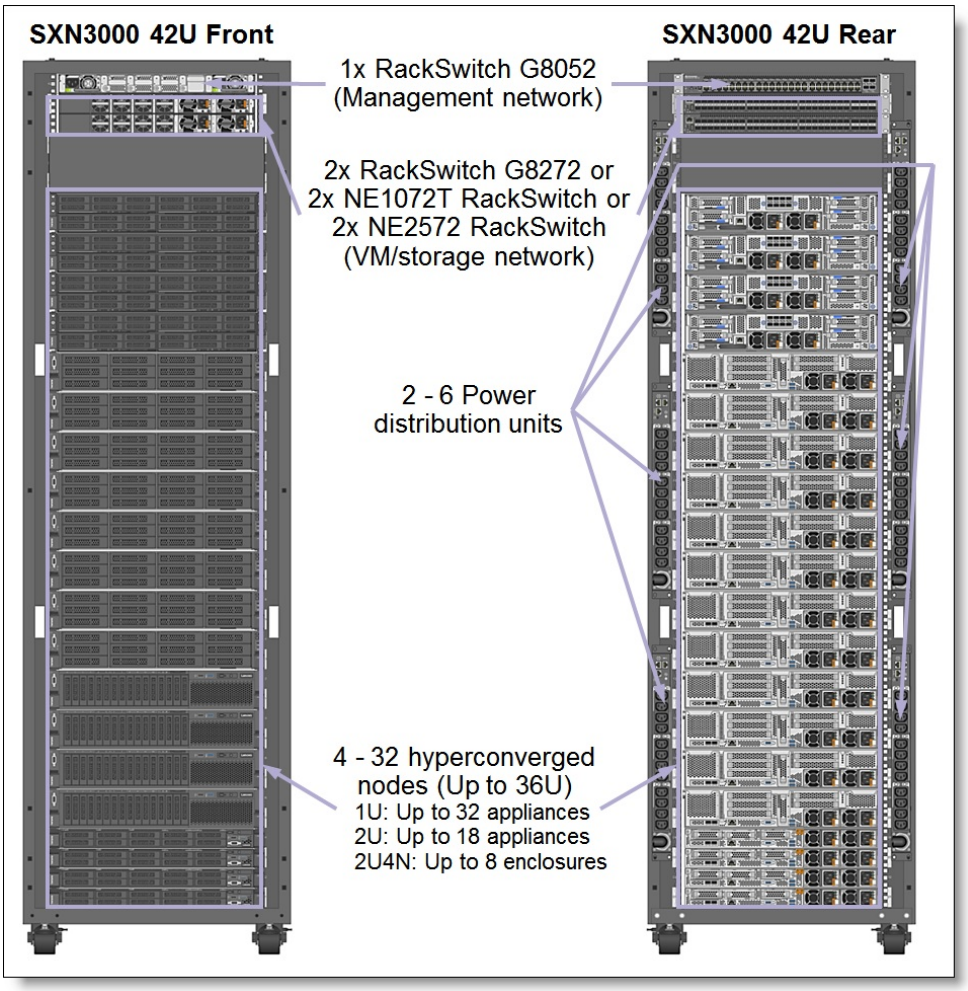

Figure 2. ThinkAgile SXN300 42U front and rear views

The front and rear views of the ThinkAgile SXN3000 25U are shown in the following figure.

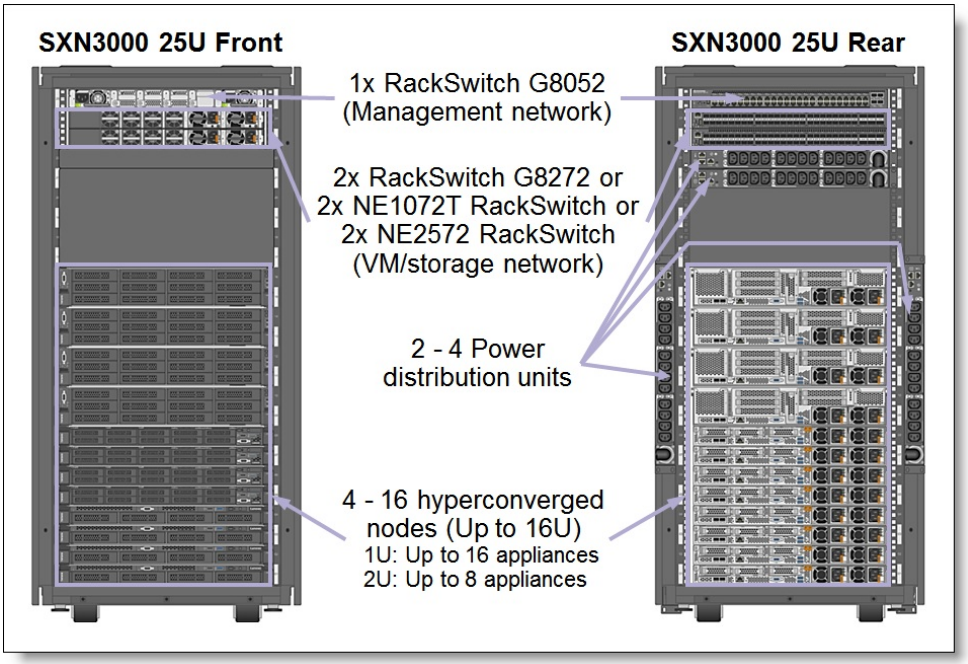

Figure 3. ThinkAgile SXN300 25U front and rear views

System specifications

The following table lists the system specifications of the ThinkAgile SX for Nutanix.

Table 1. ThinkAgile SX for Nutanix system specifications

	Specification	
Attribute	**SXN3000 42U**	**SXN3000 25U**
Form factor	42U Rack cabinet (9565-RCF)	25U Rack cabinet (9565-RCG)
Dimensions	• Height: 2009 mm • Width: 600 mm • Depth: 1096 mm	• Height: 1244 mm • Width: 605 mm • Depth: 1000 mm
Total rack load capacity	953 kg	570 kg
Maximum rack weight	1127 kg	670 kg
AC power distribution	1U 12 C13 Switched and Monitored PDUs (1-phase 208 V or 230 V AC, 3-phase 380 - 415 V [220 - 240 V] AC). IEC 320-C13 to C14 AC power cables for connecting all equipment in the rack cabinet to PDUs are included.	
PDUs (min / max)	2 / 6	2 / 4
Hardware warranty	Three-year or five-year customer-replaceable unit limited warranty with parts delivered or technician installed parts and selectable service levels: 9x5 next business day (NBD), 24x7x4, and 24x7x2.	
Software licenses	Lenovo XClarity Pro 3-year software and support license is included. Nutanix Acropolis Pro or Ultimate edition software (selectable). Nutanix Prism Pro license (optional selection). VMware vSphere 6.x Standard and vCenter Server 6.x Standard 3-year software and subscription licenses can be ordered, if required.	

Attribute	Specification	
	SXN3000 42U	**SXN3000 25U**
Management software	Lenovo XClarity Administrator, Nutanix Prism, VMware vCenter (if selected), Lenovo XClarity Energy Manager (optional).	
Nodes		
Model	• 1U nodes: ThinkAgile HX1320, HX3320. • 2U nodes: ThinkAgile HX1520-R, HX3520-G, HX5520, HX5520-C, HX7520. • 2U4N nodes: ThinkAgile HX3720 (42U rack cabinet only).	
Quantity	Up to 32 nodes maximum: • 1U nodes: 4 - 32. • 2U nodes: 4 - 18. • 2U4N nodes: 4 - 32 (1 - 8 enclosures) • A combination of 1U, 2U, and 2U4N nodes: Up to 36U of rack space.	Up to 16 nodes maximum: • 1U nodes: 4 - 16. • 2U nodes: 4 - 8. • A combination of 1U and 2U nodes: Up to 16U of rack space.
Processor	Intel Xeon Processor Scalable Family.	
Memory capacity	• HX1320: Up to 384 GB. • HX1520-R, HX3720: Up to 768 GB. • HX3320, HX3520-G, HX5520, HX7520: Up to 1536 GB. • HX5520-C: Up to 96 GB.	
Storage capacity (Capacity tier / Cache tier)	• HX1320: 16 TB / 7.68 TB or 15.36 TB (All Flash). • HX1520-R: 80 TB / 7.68 TB or 53.76 TB (All Flash). • HX3320: 20 TB / 7.68 TB, or 16 TB / 15.36 TB, or 46.08 TB (All Flash). • HX3520-G: 28 TB / 7.68 TB, or 24 TB / 15.36 TB, or 61.44 TB (All Flash). • HX3720: 8 TB / 7.68 TB, or 23.04 TB (All Flash). • HX5520: 80 TB / 7.68 TB, or 64 TB / 23.04 TB, or 53.76 TB (All Flash). • HX5520-C: 80 TB / 7.68 TB or 53.76 TB (All Flash) • HX7520: 40 TB / 15.36 TB, or 32 TB / 30.72 TB, or 61.44 TB (All Flash).	
Boot drive	2x 128 GB M.2 SSDs (RAID-1).	
Network interfaces	• 2x 10 GbE SFP+ or RJ-45 ports connected to the VM/storage network (SFP+ DAC or UTP Category 6 cables included). • 1x GbE dedicated XCC or SMM management port (RJ-45) connected to the management network (UTP Category 5E cable included).	
Management features	XClarity Controller (XCC) Enterprise, proactive platform alerts, XClarity Pro.	
Power supplies	Two redundant hot-swap High Efficiency Platinum AC power supplies: • HX1320: 550 W or 750 W Platinum, or 750 W Titanium. • HX1520-R: 750 W Platinum, or 750 W Titanium. • HX3320: 750 W or 1100 W Platinum, or 750 W Titanium. • HX3520-G: 1600 W. • HX3720 (in the HX Series enclosure): 2000 W. • HX5520: 750 W or 1100 W Platinum, or 750 W Titanium. • HX5520-C: 550 W. • HX7520: 1100 W.	
Hypervisor	• Nutanix Acropolis Hypervisor (default factory preload). • VMware ESXi 6.5 or 6.0 Update 3 (optional factory preload).	
Networking		
Management network	1x G8052 GbE switch (7159-HCJ): 48x 1 GbE RJ-45 ports and 4x 10 GbE SFP+ ports.	
Management network uplinks	• 2x 25 m 1 GbE RJ-45 UTP Category 6; or • 2x 20 m 10 GbE SFP+ active optical cables.	

Attribute	Specification	
	SXN3000 42U	**SXN3000 25U**

VM/storage network	• 10 GbE SFP+ connectivity with 2x G8272 switches (7159-HCN), each with:
	  ◦ 48x 10 GbE SFP+ ports.
	  ◦ 6x 40 GbE QSFP+ ports.
	• 10 GbE RJ-45 connectivity with 2x NE1072T switches (7159-HDB), each with:
	  ◦ 48x 10 GbE RJ-45 ports.
	  ◦ 6x 40 GbE QSFP+ ports.
	• 25 GbE SFP28 connectivity with 2x NE2572 switches (7159-HEB), each with:
	  ◦ 48x 25 GbE SFP28 ports.
	  ◦ 6x 100 GbE QSFP28 ports.	

VM network VLAG uplinks	10 GbE SFP+ network: • 4x 25 m LC-LC OM3 MMF optical cables; or • 4x 20 m 10 GbE SFP+ active optical cables; or • 4x 20 m 40 GbE QSFP+ active optical cables. 10 GbE RJ-45 network: • 4x 25 m 10 GbE RJ-45 UTP Category 6 cables; or • 4x 20 m 40 GbE QSFP+ active optical cables. 25 GbE SFP28 network: • 4x 20 m 10 GbE SFP+ active optical cables; or • 4x 20 m 25 GbE SFP28 active optical cables; or • 4x 20 m 40 GbE QSFP+ active optical cables; or • 4x 20 m 100 GbE QSFP28 active optical cables.	
Management interfaces	• G8052: In-band management. • G8272, NE1072T, NE2572: 1x 10/100/1000 Mb Ethernet.	
Software features	• G8052 (Enterprise NOS): Layer 2 and Layer 3 switching, VLANs, VLAN tagging, spanning tree, link aggregation, Hot Links, Layer 2 failover, VRRP, QoS, IP v4/v6 management and routing. • G8272, NE1072T, NE2572 (Cloud NOS): Layer 2 and Layer 3 switching, VLANs, VLAN tagging, spanning tree, link aggregation, Layer 2 failover, VRRP, QoS, CEE, IP v4/v6 management and routing, ThinkAgile Network Orchestrator.	
Cooling	• G8052: Three N+1 redundant hot-swap fans. • G8272: Four N+1 redundant hot-swap fans. • NE1072T, NE2572: Five N+1 redundant hot-swap fans.	
Power supplies	• G8052: Two redundant hot-swap 450 W AC. • G8272: Two redundant hot-swap 460 W AC. • NE1072T, NE2572: Two redundant hot-swap 770 W AC.	

Models

Factory-integrated ThinkAgile SXN3000 models of the ThinkAgile SX for Nutanix are configured by using the Lenovo Enterprise Solutions Configurator (LESC):
http://lesc.lenovo.com

Note: You are required to engage a Lenovo representative in the project that includes the ThinkAgile SX for Nutanix.

Product availability: The Lenovo ThinkAgile SXN3000 is withdrawn and no longer available for ordering.

The configuration of the ThinkAgile SX for Nutanix includes the following selectable components:

- Rack cabinet
  - 42U
  - 25U
- Power distribution infrastructure
  - 208 V AC single-phase (US)
  - 230 V AC single-phase (non-US)
  - 230 V AC three-phase (non-US)
  - 380-415 V AC three-phase (non-US)
- Node configuration
  - Node type and model
    - HX1320
    - HX1520-R
    - HX3320
    - HX3520-G
    - HX3720
    - HX5520
    - HX5520-C
    - HX7520
  - Processor model
  - Memory capacity
  - Storage capacity
  - Node quantity
    Note: During the configuration process, you are adding components to the nodes according to the output from the Nutanix Sizer tool:
    http://services.nutanix.com
- Networking
  - 10 GbE SFP+ connectivity: RackSwitch G8272
  - 10 GbE RJ-45 connectivity: ThinkSystem NE1072T RackSwitch
  - 25 GbE SFP28 connectivity: ThinkSystem NE2572 RackSwitch
  - 1 GbE management network: RackSwitch G8052 (derived by the configuration tool)
- Software
  - Lenovo XClarity Pro 3-year software and support license is included.
  - Hypervisor
    - Nutanix Acropolis Hypervisor (AHV) (factory preload; selected by default)
    - VMware vSphere (ESXi) (optional factory preload)
  - VMware vSphere software licenses
    (optional; if selected, the quantity is derived based on the number of ESXi-based nodes)
  - VMware vCenter Server licenses (optional)
  - Nutanix software edition
    - Pro (selected by default)
    - Ultimate
  - Nutanix Prism Pro (optional)
  - Lenovo XClarity Energy Manager (optional)
- Warranty
  - Three or five years of service coverage
    - 9x5 Next Business Day response with parts delivered (default selection) or onsite response
    - 24x7 4-hour or 2-hour onsite response or 24x7 6-hour committed service repair (available only in select regions)
    - Premier services (optional)
  - YourDrive YourData

- Services
  - Lenovo ThinkAgile Advantage lifecycle services: Deployment services and single point of support
  - Health check (onsite firmware updates from Lenovo) (optional)
  - Managed services (remote monitoring and management by Lenovo managed services team) (optional)

Rack cabinets

The following table lists the base models of the ThinkAgile SX for Nutanix rack cabinets.

Table 2. Base models of the ThinkAgile SX for Nutanix rack cabinet

Description	Machine Type-Model	Feature code
ThinkAgile SXN3000 for Nutanix with 25U Rack	9565-RCG	B14C
ThinkAgile SXN3000 for Nutanix with 42U Rack	9565-RCF	B14D

Configuration note: 1U, 3U, and 5U Filler panels will be derived based on the number of nodes selected.

Power distribution

Power distribution units (PDUs) are used to distribute power from an uninterruptible power supply (UPS) or utility power to the equipment within the ThinkAgile SX for Nutanix rack cabinets and to provide fault-tolerant power redundancy for high availability.

Each ThinkAgile SX for Nutanix node, management network switch, and VM/storage network switch has two redundant power supplies, and each of two power supplies is connected to a separate PDU to support topologies with redundant AC power sources.

The power distribution topology is illustrated in the following figure.

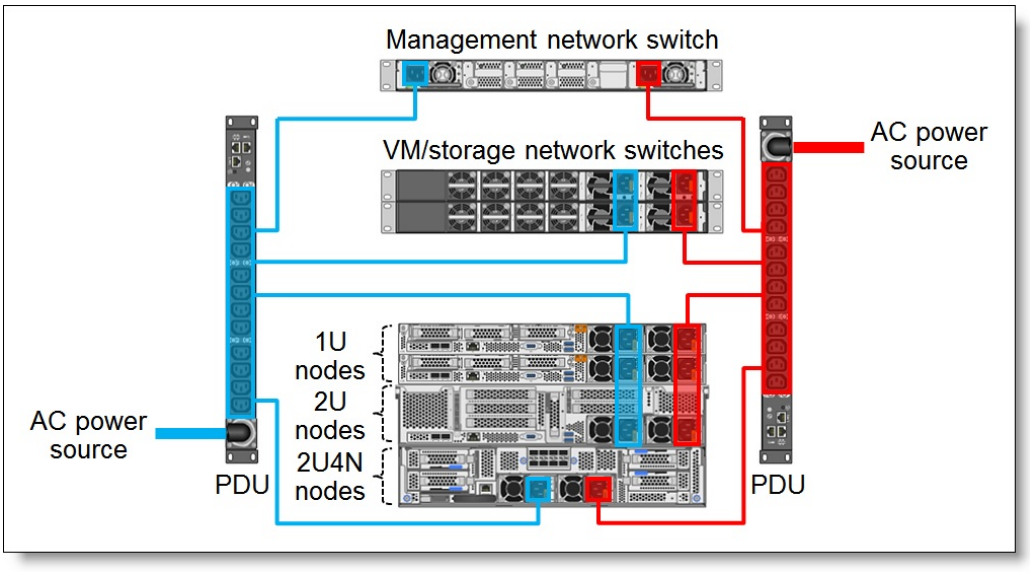

Figure 4. Power distribution topology

The following table lists the power distribution units for the ThinkAgile SX for Nutanix rack cabinets.

Table 3. Power distribution units

Description	Feature code	Quantity (min / max)	
		42U	25U
1U 12 C13 Switched and Monitored 30A/208V, NEMA L6-30P 1-Phase PDU	5908	2 / 6	2 / 4
1U 12 C13 Switched and Monitored 60A/208V, IEC 309 2P+G 1-Phase PDU	5909	2 / 6	2 / 4
1U 12 C13 Switched and Monitored 32A/230V, IEC 309 P+N+G 1-Phase PDU	5910	2 / 6	2 / 4
1U 12 C13 Switched and Monitored 63A/230V, IEC 309 P+N+G 1-Phase PDU	5911	2 / 6	2 / 4
1U 12 C13 Switched and Monitored 32A/380-415V, IEC 309 3P+N+G 3-Phase PDU	5912	2 / 6	2 / 4
1U 12 C13 Switched and Monitored 32A/230V, AS/NZ 3112 1-Phase PDU	5913	2 / 6	2 / 4
1U 12 C13 Switched and Monitored 30A/230V, KSC 8305 1-Phase PDU	5914	2 / 6	2 / 4
1U 12 C13 Switched and Monitored 16A/380-415V, IEC 309 3P+N+G 3-Phase PDU	A3T5	2 / 6	2 / 4

Configuration notes:

- Only one type of PDUs is supported within the ThinkAgile SX for Nutanix rack cabinet; different PDU types cannot be mixed within the rack cabinet.
- The quantity of PDUs required for the configuration is derived based on the ThinkAgile SX for Nutanix model and the number and type of nodes selected.
- Power cables are derived based on the ThinkAgile SX for Nutanix model and the number of nodes selected.

The following table summarizes the PDU specifications.

Table 4. PDU specifications

Feature	1U 12 C13 Switched and Monitored DPI PDU							
Feature code	5908	5909	5910	5911	5912	5913	5914	A3T5
Phase	1-phase	1-phase	1-phase	1-phase	3-phase WYE	1-phase	1-phase	3-phase WYE
Voltage	208 V AC	208 V AC	230 V AC	230 V AC	380-415 V AC (220-240 V AC)	230 V AC	230 V AC	380-415 V AC (220-240 V AC)
Line cord input amperage	24 A	48 A	32 A	63 A	32 A / phase	32 A	30 A	16 A / phase
Line cord input connector	NEMA L6-30P	IEC 309 2P+G	IEC 309 P+N+G	IEC 309 P+N+G	IEC 309 3P+N+G	AS/NZ 3112	KSC 8305	IEC 309 3P+N+G
Output connectors	12x IEC 320-C13							
Management port	10/100 Mb Ethernet							

Nodes

The ThinkAgile SX for Nutanix uses the Lenovo ThinkAgile HX Series nodes listed in the following table.

Table 5. HX Series nodes for ThinkAgile HX for Nutanix

Appliance	Processor quantity*	Memory capacity**	Storage controller	Storage capacity (Capacity tier/Cache tier)^	Hypervisor boot drive	10 GbE or 25 GbE ports	Power supply#
HX1320	1 or 2	384 GB	1x 430-8i	Hybrid: 16 TB / 7.68 TB All Flash: 15.36 TB	2x 128 GB M.2	2	2x 550 W 2x 750 W
HX1520-R	2	768 GB	1x 430-16i	Hybrid: 80 TB / 7.68 TB All Flash: 53.76 TB	2x 128 GB M.2	2	2x 750 W
HX3320	2	1536 GB	1x 430-16i	Hybrid: • 20 TB / 7.68 TB • 16 TB / 15.36 TB All Flash: 46.08 TB	2x 128 GB M.2	2	2x 750 W 2x 1100 W
HX3520-G	2	1536 GB	1x 430-16i	Hybrid: • 28 TB / 7.68 TB • 24 TB / 15.36 TB All Flash: 61.44 TB	2x 128 GB M.2	2	2x 1600 W
HX3720	2	768 GB	1x 430-8i	Hybrid: 8 TB / 7.68 TB All Flash: 23.04 TB	2x 128 GB M.2	2	2x 2000 W†
HX5520	2	1536 GB	1x 430-16i	Hybrid: • 80 TB / 7.68 TB • 64 TB / 23.04 TB All Flash: 53.76 TB	2x 128 GB M.2	2	2x 750 W 2x 1100 W
HX5520-C	1	96 GB	1x 430-16i	Hybrid: 80 TB / 7.68 TB All Flash: 53.76 TB	2x 128 GB M.2	2	2x 550 W
HX7520	2	1536 GB	3x 430-8i	Hybrid: • 40 TB / 15.36 TB • 32 TB / 30.72 TB All Flash: 61.44 TB	2x 128 GB M.2	2	2x 1100 W

* Processor model is selectable (See Processors).
** Memory capacity is configurable (See Memory).
^ Storage capacity is configurable (See Internal storage).
# Power supply is configurable for some models (See Power supplies).
† In the HX Series Enclosure.

Processors

The HX Series nodes for ThinkAgile SX for Nutanix support the Intel Xeon Processor Scalable Family. The following table lists the processor options that are available for selection.

Table 6. Processor selection options

Description	Feature code	Quantity	HX1320	HX1520-R	HX3320	HX3520-G	HX3720	HX5520	HX5520-C	HX7520
Intel Xeon Silver processors										
Intel Xeon Silver 4108 8C 85W 1.8GHz Processor	AWEG	2	N	Y	N	N	N	N	N	N
Intel Xeon Silver 4110 8C 85W 2.1GHz Processor	AWEE	1	Y	N	N	N	N	N	Y	N
Intel Xeon Silver 4110 8C 85W 2.1GHz Processor	AWEE	2	N	Y	Y	N	N	Y	N	N
Intel Xeon Silver 4114 10C 85W 2.2GHz Processor	AWEC	1	Y	N	N	N	N	N	Y	N

Description	Feature code	Quantity	HX1320	HX1520-R	HX3320	HX3520-G	HX3720	HX5520	HX5520-C	HX7520
Intel Xeon Silver 4114 10C 85W 2.2GHz Processor	AWEC	2	N	Y	Y	N	N	Y	N	N
Intel Xeon Silver 4116 12C 85W 2.1GHz Processor	AWER	2	N	Y	Y	Y	Y	Y	N	N
Intel Xeon Gold processors										
Intel Xeon Gold 5115 10C 85W 2.4GHz Processor	AWDU	1	Y	N	N	N	N	N	Y	N
Intel Xeon Gold 5115 10C 85W 2.4GHz Processor	AWDU	2	N	Y	Y	Y	Y	Y	N	N
Intel Xeon Gold 6126 12C 125W 2.6GHz Processor	AWEL	1	N	N	N	N	N	N	Y	N
Intel Xeon Gold 6126 12C 125W 2.6GHz Processor	AWEL	2	N	Y	Y	Y	Y	Y	N	Y
Intel Xeon Gold 6136 12C 150W 3.0GHz Processor	AWE3	2	N	N	Y	N	N	Y	N	N
Intel Xeon Gold 6140 18C 140W 2.3GHz Processor	AWE1	2	N	N	Y	N	Y	Y	N	Y
Intel Xeon Gold 6150 18C 165W 2.7GHz Processor	AWDT	2	N	N	Y	N	N	Y	N	Y
Intel Xeon Gold 6152 22C 140W 2.1GHz Processor	AWDV	2	N	N	Y	N	Y	Y	N	Y
Intel Xeon Platinum processors										
Intel Xeon Platinum 8153 16C 125W 2.0GHz Processor	AWDR	2	N	N	Y	Y	Y	Y	N	Y
Intel Xeon Platinum 8158 12C 150W 3.0GHz Processor	AWDS	2	N	N	Y	N	N	Y	N	Y
Intel Xeon Platinum 8164 26C 150W 2.0GHz Processor	AWDM	2	N	N	Y	N	N	Y	N	Y
Intel Xeon Platinum 8170 26C 165W 2.1GHz Processor	AWDK	2	N	N	Y	N	N	Y	N	Y
Intel Xeon Platinum 8176 28C 165W 2.1GHz Processor	AWDH	2	N	N	Y	N	N	Y	N	Y

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

Table 7. CPU specifications (HT = Hyper-Threading, TB = Turbo Boost, VT = Virtualization Technology)

CPU model	Core frequency (Base / TB Max)	Number of cores / threads	Cache	Max DDR4 frequency	Max memory per socket	UPI speed	TDP	HT	TB	VT-x	VT-d
Intel Xeon Silver processors											
4108	1.8 / 3 GHz	8 / 16	11 MB	2400 MHz	768 GB	9.6 GT/s	85W	Yes	Yes	Yes	Yes
4110	2.1 / 3 GHz	8 / 16	11 MB	2400 MHz	768 GB	9.6 GT/s	85W	Yes	Yes	Yes	Yes
4114	2.2 / 3 GHz	10 / 20	13.75 MB	2400 MHz	768 GB	9.6 GT/s	85W	Yes	Yes	Yes	Yes
4116	2.1 / 3 GHz	12 / 24	16.5 MB	2400 MHz	768 GB	9.6 GT/s	85W	Yes	Yes	Yes	Yes
Intel Xeon Gold processors											
5115	2.4 / 3.2 GHz	10 / 20	13.75 MB	2400 MHz	768 GB	10.4 GT/s	85W	Yes	Yes	Yes	Yes
6126	2.6 / 3.7 GHz	12 / 24	19.25 MB	2666 MHz	768 GB	10.4 GT/s	125W	Yes	Yes	Yes	Yes
6136	3.0 / 3.7 GHz	12 / 24	24.75 MB	2666 MHz	768 GB	10.4 GT/s	150W	Yes	Yes	Yes	Yes
6140	2.3 / 3.7 GHz	18 / 36	24.75 MB	2666 MHz	768 GB	10.4 GT/s	140W	Yes	Yes	Yes	Yes
6150	2.7 / 3.7 GHz	18 / 36	24.75 MB	2666 MHz	768 GB	10.4 GT/s	165W	Yes	Yes	Yes	Yes
6152	2.1 / 3.7 GHz	22 / 44	30.25 MB	2666 MHz	768 GB	10.4 GT/s	140W	Yes	Yes	Yes	Yes
Intel Xeon Platinum processors											
8153	2.0 / 2.8 GHz	16 / 32	22 MB	2666 MHz	768 GB	10.4 GT/s	125W	Yes	Yes	Yes	Yes
8158	3.0 / 3.7 GHz	12 / 24	24.75 MB	2666 MHz	768 GB	10.4 GT/s	150W	Yes	Yes	Yes	Yes
8164	2.0 / 3.7 GHz	26 / 52	35.75 MB	2666 MHz	768 GB	10.4 GT/s	150W	Yes	Yes	Yes	Yes
8170	2.1 / 3.7 GHz	26 / 52	35.75 MB	2666 MHz	768 GB	10.4 GT/s	165W	Yes	Yes	Yes	Yes
8176	2.1 / 3.8 GHz	28 / 56	38.5 MB	2666 MHz	768 GB	10.4 GT/s	165W	Yes	Yes	Yes	Yes

Memory

The HX Series for ThinkAgile SX for Nutanix 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 following rules apply when selecting the memory configuration:

- For appliances that support RDIMMs or LRDIMMs, mixing RDIMMs and LRDIMMs is not supported.
- All DIMMs in the appliance must be of the same type and capacity.
- All DIMMs in the appliance operate at the same speed up to 2666 MHz, which is determined by the maximum memory speed supported by the specific processor.
  Note: Maximum memory speed can be achieved when Max performance mode is enabled in UEFI.

The following memory protection technologies are supported:

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

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

Table 8. Memory selection options

Selection option	Description	Feature code	Quantity	HX1320	HX1520-R	HX3320	HX3520-G	HX3720	HX5520	HX5520-C	HX7520
RDIMMs											
64 GB	16GB TruDDR4 2666 MHz (2Rx8 1.2V) RDIMM	AUNC	4	Y	N	N	N	N	N	Y	N
96 GB	16GB TruDDR4 2666 MHz (2Rx8 1.2V) RDIMM	AUNC	6	Y	N	N	N	N	N	Y	N
96 GB	8GB TruDDR4 2666 MHz (1Rx8 1.2V) RDIMM	AUU1	12	Y	N	N	N	N	N	N	N
128 GB*	16GB TruDDR4 2666 MHz (2Rx8 1.2V) RDIMM	AUNC	8	Y	Y	Y	Y	N	Y	N	N
192 GB	16GB TruDDR4 2666 MHz (2Rx8 1.2V) RDIMM	AUNC	12	Y	Y	Y	Y	Y	Y	N	N
256 GB*	32GB TruDDR4 2666 MHz (2Rx4 1.2V) RDIMM	AUND	8	Y	Y	Y	Y	N	Y	N	Y
384 GB	32GB TruDDR4 2666 MHz (2Rx4 1.2V) RDIMM	AUND	12	Y	Y	Y	Y	Y	Y	N	Y
512 GB*	32GB TruDDR4 2666 MHz (2Rx4 1.2V) RDIMM	AUND	16	N	Y	Y	Y	N	Y	N	Y
768 GB	32GB TruDDR4 2666 MHz (2Rx4 1.2V) RDIMM	AUND	24	N	Y	Y	Y	N	Y	N	Y
LRDIMMs											
768 GB	64GB TruDDR4 2666 MHz (4Rx4 1.2V) LRDIMM	AUNE	12	N	Y	Y	Y	Y	Y	N	Y
1536 GB	64GB TruDDR4 2666 MHz (4Rx4 1.2V) LRDIMM	AUNE	24	N	N	Y	Y	N	Y	N	Y

* System performance might be impacted due to unbalanced memory configuration.

Internal storage

The ThinkAgile HX Series appliances support the internal drive configurations listed in the following tables.

Table 9. Internal drive configurations: Hybrid

Model	Hot-swap drive quantity and form factor			Hypervisor boot drive	
	HDDs (min / max)	SSDs	Storage controller	M.2 6 Gb SATA SSDs	Storage controller
HX1320 Hybrid	2 / 2 LFF	2 LFF	1x 430-8i	2x 128 GB	M.2 with Mirroring
HX1520-R Hybrid	6 / 12 LFF	2 LFF	1x 430-16i	2x 128 GB	M.2 with Mirroring
HX3320 Hybrid	4 / 10 SFF	2 SFF	1x 430-16i	2x 128 GB	M.2 with Mirroring
	4 / 9 SFF	3 SFF	1x 430-16i	2x 128 GB	M.2 with Mirroring
	4 / 8 SFF	4 SFF	1x 430-16i	2x 128 GB	M.2 with Mirroring
HX3520-G Hybrid	6 / 14 SFF	2 SFF	1x 430-16i	2x 128 GB	M.2 with Mirroring
	6 / 13 SFF	3 SFF	1x 430-16i	2x 128 GB	M.2 with Mirroring
	6 / 12 SFF	4 SFF	1x 430-16i	2x 128 GB	M.2 with Mirroring
HX3720 Hybrid	4 / 4 SFF	2 SFF	1x 430-8i	2x 128 GB	M.2 with Mirroring
HX5520 Hybrid	6 / 12 LFF	2 LFF	1x 430-16i	2x 128 GB	M.2 with Mirroring
	6 / 11 LFF	3 LFF	1x 430-16i	2x 128 GB	M.2 with Mirroring
	6 / 10 LFF	4 LFF	1x 430-16i	2x 128 GB	M.2 with Mirroring
	6 / 9 LFF	5 LFF	1x 430-16i	2x 128 GB	M.2 with Mirroring
	6 / 8 LFF	6 LFF	1x 430-16i	2x 128 GB	M.2 with Mirroring
HX5520-C Hybrid	6 / 12 LFF	2 LFF	1x 430-16i	2x 128 GB	M.2 with Mirroring
HX7520 Hybrid	12 / 20 SFF	4 SFF	3x 430-8i	2x 128 GB	M.2 with Mirroring
	12 / 19 SFF	5 SFF	3x 430-8i	2x 128 GB	M.2 with Mirroring
	12 / 18 SFF	6 SFF	3x 430-8i	2x 128 GB	M.2 with Mirroring
	12 / 17 SFF	7 SFF	3x 430-8i	2x 128 GB	M.2 with Mirroring
	12 / 16 SFF	8 SFF	3x 430-8i	2x 128 GB	M.2 with Mirroring

Table 10. Internal drive configurations: All Flash

Model	Hot-swap drive quantity and form factor		Hypervisor boot drive	
	SSDs (min / max)	Storage controller	M.2 6 Gb SATA SSDs	Storage controller
HX1320 All Flash	4 / 4 LFF	1x 430-8i	2x 128 GB	M.2 with Mirroring
HX1520-R All Flash	6 / 14 LFF	1x 430-16i	2x 128 GB	M.2 with Mirroring
HX3320 All Flash	6 / 12 SFF	1x 430-16i	2x 128 GB	M.2 with Mirroring
HX3520-G All Flash	8 / 16 SFF	1x 430-16i	2x 128 GB	M.2 with Mirroring
HX3720 All Flash	4 / 6 SFF	1x 430-8i	2x 128 GB	M.2 with Mirroring
HX5520 All Flash	6 / 14 LFF	1x 430-16i	2x 128 GB	M.2 with Mirroring
HX5520-C All Flash	6 / 14 LFF	1x 430-16i	2x 128 GB	M.2 with Mirroring
HX7520 All Flash	12 / 24 SFF	3x 430-8i	2x 128 GB	M.2 with Mirroring

The following tables list the drive selection options for hybrid and all flash configurations.

Table 11. Drive selection options: SFF Hybrid configurations

Description	Feature code	Quantity (min / max)			
		HX3320	HX3520-G	HX3720	HX7520
SSD selection: Cache tier					
ThinkSystem 2.5" Intel S4600 480GB Mainstream SATA 6Gb Hot Swap SSD	B0ZQ	2 / 4	2 / 4	2 / 2	4 / 8
ThinkSystem 2.5" Intel S4600 960GB Mainstream SATA 6Gb Hot Swap SSD	B0ZR	2 / 4	2 / 4	2 / 2	4 / 8
ThinkSystem 2.5" Intel S4600 1.92TB Mainstream SATA 6Gb Hot Swap SSD	B0ZS	2 / 4	2 / 4	2 / 2	4 / 8
ThinkSystem 2.5" PM1633a 3.84TB Capacity SAS 12Gb Hot Swap SSD	AUMK	2 / 4	2 / 4	2 / 2	4 / 8
HDD selection: Capacity tier					
ThinkSystem 2.5" 1TB 7.2K SATA 6Gb Hot Swap 512n HDD	AUUE	4 / 10	6 / 14	4 / 4	12 / 20
ThinkSystem 2.5" 2TB 7.2K SATA 6Gb Hot Swap 512e HDD	AUUJ	4 / 10	6 / 14	4 / 4	12 / 20

Table 12. Drive selection options: LFF Hybrid configurations

Description	Feature code	Quantity (min / max)			
		HX1320	HX1520-R	HX5520	HX5520-C
SSD selection: Cache tier					
ThinkSystem 3.5" Intel S4600 480GB Mainstream SATA 6Gb Hot Swap SSD	B0ZU	2 / 2	2 / 2	2 / 6	2 / 2
ThinkSystem 3.5" Intel S4600 960GB Mainstream SATA 6Gb Hot Swap SSD	B0ZV	2 / 2	2 / 2	2 / 6	2 / 2
ThinkSystem 3.5" Intel S4600 1.92TB Mainstream SATA 6Gb Hot Swap SSD	B109	2 / 2	2 / 2	2 / 6	2 / 2
ThinkSystem 3.5" PM1633a 3.84TB Capacity SAS 12Gb Hot Swap SSD	B2XC	2 / 2	2 / 2	2 / 6	2 / 2
HDD selection: Capacity tier					
ThinkSystem 3.5" 4TB 7.2K SATA 6Gb Hot Swap 512n HDD	AUU8	2 / 2	6 / 12	6 / 12	6 / 12
ThinkSystem 3.5" 6TB 7.2K SATA 6Gb Hot Swap 512e HDD	AUUA	2 / 2	6 / 12	6 / 12	6 / 12
ThinkSystem 3.5" 8TB 7.2K SATA 6Gb Hot Swap 512e HDD	AUU9	2 / 2	6 / 10	6 / 10	6 / 10

Table 13. Drive selection options: SFF All Flash configurations

Description	Feature code	Quantity (min / max)			
		HX3320	HX3520-G	HX3720	HX7520
ThinkSystem 2.5" Intel S4600 480GB Mainstream SATA 6Gb Hot Swap SSD	B0ZQ	6 / 12	8 / 16	4 / 6	12 / 24
ThinkSystem 2.5" Intel S4600 960GB Mainstream SATA 6Gb Hot Swap SSD	B0ZR	6 / 12	8 / 16	4 / 6	12 / 24
ThinkSystem 2.5" Intel S4600 1.92TB Mainstream SATA 6Gb Hot Swap SSD	B0ZS	6 / 12	8 / 16	4 / 6	12 / 24
ThinkSystem 2.5" PM1633a 3.84TB Capacity SAS 12Gb Hot Swap SSD	AUMK	6 / 12	8 / 16	4 / 6	12 / 16

Table 14. Drive selection options: LFF All Flash configurations

Description	Feature code	Quantity (min / max)			
		HX1320	HX1520-R	HX5520	HX5520-C
ThinkSystem 3.5" Intel S4600 480GB Mainstream SATA 6Gb Hot Swap SSD	B0ZU	4 / 4	6 / 14	6 / 14	6 / 14
ThinkSystem 3.5" Intel S4600 960GB Mainstream SATA 6Gb Hot Swap SSD	B0ZV	4 / 4	6 / 14	6 / 14	6 / 14
ThinkSystem 3.5" Intel S4600 1.92TB Mainstream SATA 6Gb Hot Swap SSD	B109	4 / 4	6 / 14	6 / 14	6 / 14
ThinkSystem 3.5" PM1633a 3.84TB Capacity SAS 12Gb Hot Swap SSD	B2XC	4 / 4	6 / 14	6 / 14	6 / 14

Configuration note: All SSD drives in the appliance must be of the same type and capacity. All HDD drives in the appliance must be of the same type and capacity.

Network connectivity

Two-port 10 GbE RJ-45 or 10 GbE SFP+ network connectivity is provided by the onboard Intel X722 NIC and a LOM card installed in the appliance or an Ethernet I/O Module (EIOM) installed in the HX Series enclosure.

Two-port 25 GbE SFP28 network connectivity is provided by the Mellanox ConnectX-4 Lx 2x25GbE SFP28 Adapter that can be installed in the appliance instead of 10 GbE connections.

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

Table 15. Network adapter options

Description	Feature code	Quantity
10 GbE LOM cards for 1U and 2U nodes		
ThinkSystem 10Gb 2-port Base-T LOM (RJ-45)	AUKL	1
ThinkSystem 10Gb 2-port SFP+ LOM	AUKJ	1
10 GbE EIOM modules for HX Series enclosure		
ThinkSystem D2 10Gb 8 port EIOM Base-T RJ-45	AUYA	1
ThinkSystem D2 10Gb 8 port EIOM SFP+	AUY9	1
25 GbE network adapters for 1U, 2U, and 2U4N nodes		
Mellanox ConnectX-4 Lx 2x25GbE SFP28 Adapter	AUAJ	1

Configuration note: All 25 GbE SFP28 DAC cables, 10 GbE SFP+ DAC cables, or RJ-45 Category 6 cables for the VM/storage network are derived based on the number of nodes selected.

Power supplies

The HX Series appliances ship with two power supplies. The following table lists the power supply options that are available for selection.

Table 16. Power supply selection options

Description	Feature code^	Quantity	HX1320	HX1520-R	HX3320	HX3520-G	HX3720	HX5520	HX5520-C	HX7520
550W(230V/115V) Platinum Hot-Swap Power Supply	AVW8 / AVWC	2	Y	N	N	N	N	N	Y	N
750W(230/115V) Platinum Hot-Swap Power Supply	AVWA / AVWD	2	Y	Y	Y	N	N	Y	N	N
750W (230V) Titanium Hot-Swap Power Supply	AVW9 / AVWE	2	Y	Y	Y	N	N	Y	N	N
1100W (230V/115V) Platinum Hot-Swap Power Supply	AVWB / AVWF	2	N	N	Y	N	N	Y	N	Y
1600W (230V) Platinum Hot-Swap Power Supply	AVWG	2	N	N	N	Y	N	N	N	N
D2 2000W Platinum PSU	AUZ2	2	N	N	N	N	Y*	N	N	N

^ Where applicable, the feature code is shown for 1U appliances / 2U appliances.
* In the HX Series Enclosure.

Configuration note: For N+N power redundancy, the power supplies should provide sufficient power without oversubscription for the selected node configuration. To ensure that the right power supply is chosen, you should always validate your appliance configuration using the latest version of the Lenovo Capacity Planner: http://datacentersupport.lenovo.com/us/en/solutions/lnvo-lcp

For more information about the ThinkAgile HX Series appliances, refer to the following Lenovo Press Product Guides:

- Lenovo ThinkAgile HX1320 and HX1520-R Appliances
  http://lenovopress.com/lp0726
- Lenovo ThinkAgile HX3320, HX3520-G, and HX3720 Appliances
  http://lenovopress.com/lp0728
- Lenovo ThinkAgile HX5520 and HX5520-C Appliances
  http://lenovopress.com/lp0729
- Lenovo ThinkAgile HX7520 Appliance
  http://lenovopress.com/lp0730

Networking

The ThinkAgile SX for Nutanix uses the Lenovo RackSwitch G8052 to provide management network connectivity. For VM/storage network, customers can choose either 10 GbE SFP+ connections by selecting two RackSwitch G8272 switches, 10 GbE RJ-45 connections by selecting two ThinkSystem NE1072T switches, or 25 GbE SFP28 connections by selecting two ThinkSystem NE2572 switches. VM/storage network uses a pair of switches for availability and redundancy purposes.

Dedicated XCC management ports on the 1U and 2U nodes, an SMM management port on the 2U4N enclosure, management ports on the G8272, NE1072T, or NE2572 VM/storage network switches, and management ports on the monitored PDUs are connected to the G8052 management network switch. A management network switch provides two 1 GbE uplinks (2x 25 m RJ-45 UTP Category 6 cables) or two 10 GbE uplinks (2x 20 m SFP+ to SFP+ Active Optical Cables) for upstream network integration.

If 10 GbE network connectivity is used, two 10 GbE ports on each node are connected to a pair of the G8272 (10 GbE SFP+) or NE1072T (10 GbE RJ-45) VM/storage network switches. The switches are connected to each other via two 40 GbE links configured as a LAG.

If 25 GbE network connectivity is used, two 25 GbE ports on each node are connected to a pair of the NE2572 (25 GbE SFP28) VM/storage network switches. The switches are connected to each other via two 100 GbE links configured as a LAG.

Each of two G8272 switches provides two 10 GbE LC uplinks (2x 10GBASE-SR SFP+ transceivers with 25m LC-LC OM3 MMF cables), two 10 GbE SFP+ uplinks (2x 20 m SFP+ to SFP+ Active Optical Cables), or two 40 GbE QSFP+ uplinks (2x 20 m QSFP+ to QSFP+ Active Optical Cables) that are configured in a virtual link aggregation group (VLAG) for upstream network integration.

Each of two NE1072T switches provides two 10 GbE RJ-45 uplinks (2x 25 m RJ-45 UTP Category 6 cables) or two 40 GbE QSFP+ uplinks (2x 20 m QSFP+ to QSFP+ Active Optical Cables) that are configured in a virtual link aggregation group (VLAG) for upstream network integration.

Each of two NE2572 switches provides two 10 GbE SFP+ uplinks (2x 20 m SFP+ to SFP+ Active Optical Cables), two 25 GbE SFP28 uplinks (2x 20m 25G SFP28 Active Optical Cables), two 40 GbE QSFP+ uplinks (2x 20 m QSFP+ to QSFP+ Active Optical Cables), or two 100 GbE uplinks (2x 20m 100G QSFP28 Active Optical Cables) that are configured in a virtual link aggregation group (VLAG) for upstream network integration.

The 10 GbE network connectivity topology is illustrated in the following figure.

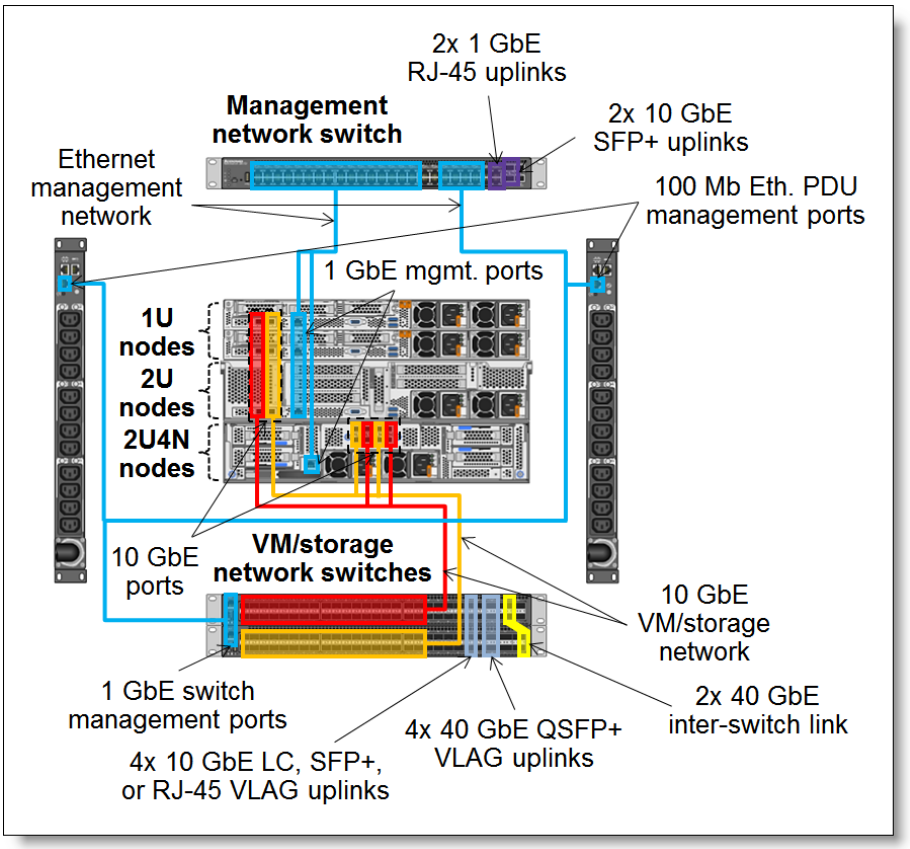

Figure 5. 10 GbE network connectivity topology

The 25 GbE network connectivity topology is illustrated in the following figure.

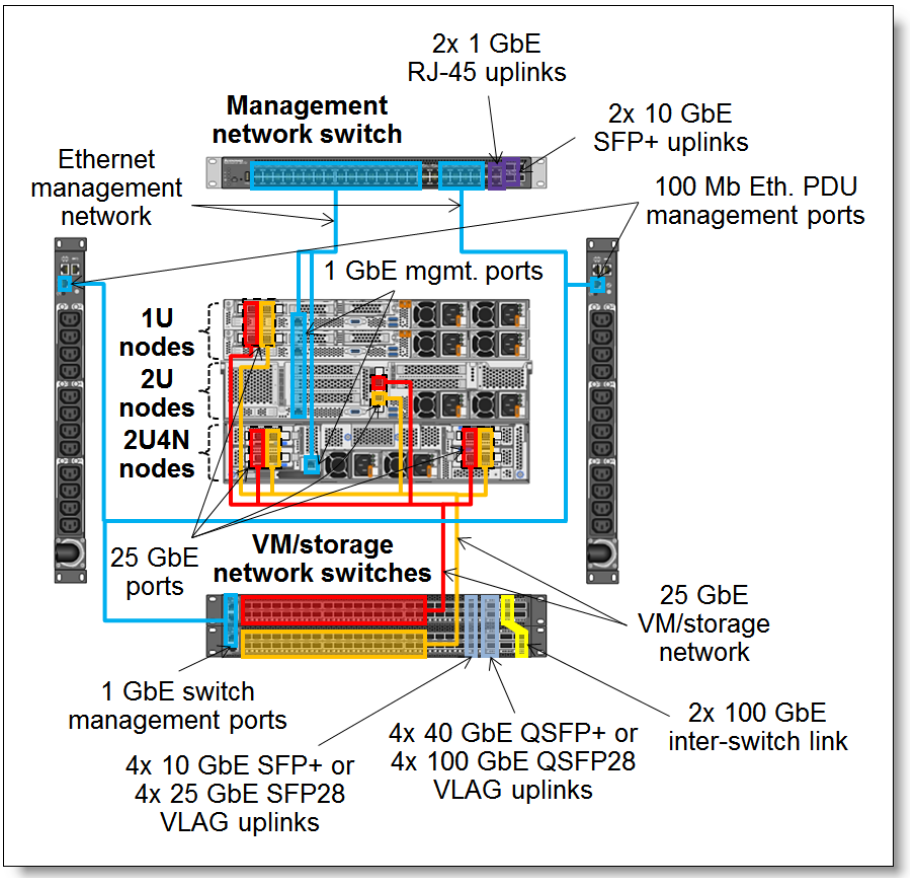

Figure 6. 25 GbE network connectivity topology

The following table lists available switches.

Table 17. RackSwitch options for ThinkAgile SX for Nutanix

Description	Machine Type-Model	Feature code	Quantity
1 GbE management network			
RackSwitch G8052 (Rear to Front) for ThinkAgile SXN	7159-HCJ	B205	1
10 GbE SFP+ VM/storage network			
RackSwitch G8272 (Rear to Front) for ThinkAgile SXN	7159-HCN	B14F	2
10 GbE RJ-45 VM/storage network			
NE1072T RackSwitch (Rear to Front) for ThinkAgile SXN	7159-HDB	B14G	2
25 GbE SFP28 VM/storage network			
NE2572 RackSwitch (Rear to Front) for ThinkAgile SXN	7159-HEB	B22G	2

The following table summarizes specifications of the RackSwitch switches for ThinkAgile SX for Nutanix.

Table 18. RackSwitch specifications summary

Feature	G8052	G8272	NE1072T	NE2572
Software	ENOS	CNOS	CNOS	CNOS
Ports	• 48x GbE RJ-45 fixed • 4x 10 GbE SFP+	• 48x 10 GbE SFP+ • 6x 40 GbE QSFP+	• 48x 10 GbE RJ-45 • 6x 40 GbE QSFP+	• 48x 25 GbE SFP28 • 6x 100 GbE QSFP28
Management ports	In-band management	1x GbE RJ-45	1x GbE RJ-45	1x GbE RJ-45
Layer 2 switching	Yes	Yes	Yes	Yes
Layer 3 switching	Yes	Yes	Yes	Yes
VLANs	Yes	Yes	Yes	Yes
VLAN tagging	Yes	Yes	Yes	Yes
Link aggregation	Yes	Yes	Yes	Yes
Virtual link aggregation	Yes	Yes	Yes	Yes
Quality of Service	Yes	Yes	Yes	Yes
IPv4/IPv6 management	Yes	Yes	Yes	Yes
IPv4/IPv6 routing	Yes	Yes	Yes	Yes
Converged Enhanced Ethernet	No	Yes	Yes	Yes
VM-aware network provisioning*	No	Yes	Yes	Yes
Cooling	3x hot-swap fans (N+1 redundancy)	4x hot-swap fans (N+1 redundancy)	5x hot-swap fans (N+1 redundancy)	5x hot-swap fans (N+1 redundancy)
Power supplies	2x 450 W AC redundant hot-swap	2x 460 W AC redundant hot-swap	2x 770 W AC redundant hot-swap	2x 770 W AC redundant hot-swap

* The ThinkAgile Network Orchestrator feature that works with the AHV hypervisor.

ThinkAgile Network Orchestrator gives increased visibility of the virtual infrastructure and automates VM-aware network provisioning and configuration updates for VLANs, virtual NICs, virtual networks, ACLs, and QoS based on the VM associations in a hyperconverged Nutanix environment (requires the AHV hypervisor).

For more information about the RackSwitch switches, see the following Lenovo Press Product Guides:

- Lenovo RackSwitch G8052
  http://lenovopress.com/tips1270
- Lenovo RackSwitch G8272
  http://lenovopress.com/tips1267
- Lenovo ThinkSystem NE1072T RackSwitch
  http://lenovopress.com/lp0607

The following table lists cables that are available for selection for the uplink ports.

Table 19. Cable selection options

Description	Feature code	Quantity per switch (min / max)	G8052	G8272	NE1072T	NE2572
1 GbE uplinks (management network)						
25m CAT6 Green Cable	A1MW	0 / 2	Y	N	N	N
10 GbE LC uplinks (VM/storage network)						
10GBASE-SR SFP+ Transceiver	5053	0 / 2	N	Y	N	N
25m LC-LC OM3 MMF Cable	ASRB	0 / 2	N	Y	N	N
10 GbE SFP+ uplinks (management network, VM/storage network)						
20m SFP+ to SFP+ Active Optical Cable	ATZ2	0 / 2	Y	Y	N	Y
10 GbE RJ-45 uplinks (VM/storage network)						
25m CAT6 Green Cable	A1MW	0 / 2	N	N	Y	N
25 GbE SFP28 uplinks (VM/storage network)						
20m 25G SFP28 Active Optical Cable	AV1K	0 / 2	N	N	N	Y
40 GbE QSFP+ uplinks (VM/storage network)						
20m QSFP+ to QSFP+ Active Optical Cable	ATZ7	0 / 2	N	Y	Y	Y
100 GbE QSFP28 uplinks (VM/storage network)						
20m 100G QSFP28 Active Optical Cable	AV1Q	0 / 2	N	N	N	Y

Configuration notes:

- All UTP Category 5E cables for the 1 GbE management network and 25 GbE SFP 28 DAC cables, 10 GbE SFP+ DAC cables, or 10 GbE RJ-45 UTP Category 6 cables for the VM/storage network are derived based on the number of nodes selected.
- Selection of uplink connections for the management and VM/storage networks is required:
  - Management network (G8052): 1 GbE RJ-45 or 10 GbE SFP+
  - VM/storage network:
    - G8272: 10 GbE LC, 10 GbE SFP+, or 40 GbE QSFP+
    - NE1072T: 10 GbE RJ-45 or 40 GbE QSFP+
    - NE2572: 10 GbE SFP+, 25 GbE SFP28, 40 GbE QSFP+, or 100 GbE QSFP28

Software

The ThinkAgile SX for Nutanix includes the following software components:

- Hypervisor
  - Nutanix Acropolis Hypervisor (AHV) (default preload selection)
  - VMware vSphere ESXi 6.5 or 6.0 Update 3 (optional preload selection) (vSphere software and subscription licenses for the solution can be purchased from Lenovo, if not provided by the customer)
- Nutanix Acropolis Pro (default selection) or Ultimate (optional selection) Edition
- VMware vCenter Server virtual appliance (if ESXi is selected) (vCenter Server software and subscription licenses for the solution can be purchased from Lenovo, if not provided by the customer)
- Lenovo XClarity Pro (included)
- Lenovo ThinkAgile Network Orchestrator (AHV environments only)
- Nutanix Prism Starter (default) or Pro (optional)
- Lenovo XClarity Energy Manager (optional)

Optionally, VMware vSphere 6 Standard and vCenter Server 6 Standard software and subscription licenses can be selected for ESXi-based deployments, if not provided by the customer (see the following table for details). The quantity of vSphere licenses is calculated automatically based on the number of HX Series nodes selected.

Table 20. Optional VMware licenses

Description	Quantity
VMware vSphere 6 Standard for 2 Processor Server License and Subscription	1 per HX node
VMware vCenter Srv 6 Std for vSphere 6 (Per Instance) License and Subscription	0 - 12

Nutanix software

The HX Series appliances can be configured with one of the Nutanix Software editions that are listed in the following table. The appropriate license can be downloaded from the Nutanix website to match the serial number of the appliance. The quantity of Nutanix licenses is calculated automatically based on the number of HX Series nodes selected.

Table 21. Nutanix software options

Description	Feature code	Quantity
Nutanix Pro Edition (default selection)	ATSH	1 per HX node
Nutanix Ultimate Edition	ATSJ	1 per HX node

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 22. Nutanix software editions feature comparison

Feature	Nutanix software edition	
	Pro	**Ultimate**
Enterprise storage		
Cluster size	Unlimited	Unlimited
Heterogeneous clusters	Yes	Yes
VM-centric snapshots and clones	Yes	Yes
Volume groups	Yes	Yes
Data tiering	Yes	Yes
Online cluster grow/shrink	Yes	Yes
Acropolis container services	Yes	Yes
Inline compression	Yes	Yes
Inline performance deduplication	Yes	Yes
MapReduce compression	Yes	Yes
MapReduce deduplication	Yes	Yes
Erasure Coding (EC-X)	Yes	Yes
Acropolis block services	Yes	Yes
Acropolis file services	No	Yes
VM Flash Mode (Pin to SSD)	No	Yes
Infrastructure resilience		
Data path redundancy	Yes	Yes
Redundancy factor	2 or 3 (Tunable)	2 or 3 (Tunable)
Availability domains	Yes	Yes
Data protection		
Asynchronous replication and disaster recovery (DR)	Yes	Yes
Application-consistent snapshots	Yes	Yes
Time Stream (Converged local backups)	Yes	Yes
VSS integration	Yes	Yes
Cloud Connect (Backup to public clouds)	Yes	Yes
Self-service restore	Yes	Yes
Multiple site DR (many to many)	No	Yes
Metro availability	No	Yes
Synchronous replication and disaster recovery	No	Yes
Security		
Client authentication	Yes	Yes
Cluster lockdown	Yes	Yes
Data-at-rest encryption	No	Yes
Management and analytics		
Prism Starter (Single- and multi-cluster management)	Yes	Yes
Pulse (Automated service agent)	Yes	Yes
Cluster health	Yes	Yes

Feature	Nutanix software edition	
	Pro	Ultimate
One-click upgrades (Nutanix OS and Hypervisor)	Yes	Yes
Rest APIs	Yes	Yes
Virtualization		
VMware vSphere support	Yes	Yes
Microsoft Hyper-V support	Yes	Yes
Built-in Acropolis Hypervisor	Yes	Yes
VM operations	Yes	Yes
Intelligent VM placement	Yes	Yes
Virtual network configuration	Yes	Yes
Host profiles	Yes	Yes
VM high availability	Yes	Yes
Self-service portal	Yes	Yes

VMware vCenter Server

VMware vCenter Server offers the following key features:

- Centralized management of virtualized hosts and virtual machines from a single console.
- Centralized inventory of virtual machines, hosts, datastores and networks.
- Alerts and notifications can trigger automated workflows to remedy and preempt problems.
- Host profiles standardize and simplify configuration and management of VMware ESXi hosts.
- Resource management for virtual machines allows to control allocation of processor, memory, disk and network resources.
- Continuously monitors utilization across resource pools and intelligently allocates available resources among virtual machines according to predefined rules
- Automatically restarts virtual machines that have failed without manual intervention with VMware vSphere HA.
- Maintains records of significant configuration changes and exports reports for event tracking.
- Patch management enforces compliance to patch standards through automated scanning and patching of online ESXi hosts and select Microsoft and Linux virtual machines.

Lenovo XClarity Pro

Lenovo XClarity Pro offers the following features for the ThinkAgile SX for Nutanix:

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

Lenovo ThinkAgile Network Orchestrator

ThinkAgile Network Orchestrator gives increased visibility of the virtual infrastructure to Nutanix Prism, including VM and virtual network information. It provides automated VM-aware provisioning by dynamically configuring VLANs in the physical network based on the auto-discovered virtual network topology. The agent also performs ongoing dynamic updates to the physical network configuration in response to new VMs, updated VMs, and deleted VMs and virtual networks, eliminating errors with manual configuration.

Nutanix Prism

Nutanix Prism gives administrators a simple 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 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. The quantity of licenses is calculated automatically based on the number of HX Series nodes selected.

Table 23. Prism Pro software license options

Description	Quantity
Nutanix Prism Pro	1 per HX node

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

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. It can also be used in conjunction with the PDUs used in the ThinkAgile SX for Nutanix solutions to monitor power consumption and set thresholds.

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.

Warranty

The ThinkAgile SX for Nutanix can be configured with a three-year (default selection) or five-year (optional selection) hardware warranty and software support with 24x7 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.

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 spares parts.

Lenovo warranty service coverage levels are region-specific. Not all warranty service levels are available in every region. For information about Lenovo warranty services that are available in your 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/

The following Lenovo warranty service levels are available for the ThinkAgile SX for Nutanix:

- 3 or 5 years of warranty service coverage
  - Base warranty: 9x5 Next Business Day response with parts delivered
  - Foundation Service: 9x5 service coverage with next business day onsite response
  - Essential Service: 24x7 service coverage with 4-hour onsite response or 24-hour committed repair (available only in select regions)
  - Advanced Service: 24x7 service coverage with 2-hour onsite response or 6-hour committed repair (available only in select regions)
- YourDrive YourData
  Lenovo's YourDrive YourData service (where applicable) 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 system. 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 Foundation, Essential, or Advanced Service upgrades and extensions.

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

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

The ThinkAgile SX for Nutanix also includes a three-year (default selection) or five-year (optional selection) Nutanix 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)

Deployment services

The following ThinkAgile Advantage services performed in the factory and onsite are included with the ThinkAgile SX for Nutanix solutions to get customers up and running quickly:

- Conducting remote preparation and planning
- Verifying firmware versions and performing firmware updates, if needed
- Configuring network switches
- Configuring XCC management settings
- Configuring Nutanix
- Configuring hypervisor settings
- Discovering hosts and storage
- Configuring Lenovo XClarity network settings and performing discovery and inventory
- Transferring knowledge
- Developing post-installation documentation

Physical specifications

The ThinkAgile SXN3000 42U model has the following dimensions and weight (approximate):

- Height: 2009 mm (79.1 in)
- Width: 600 mm (23.6 in)
- Depth: 1096 mm (43.1 in)
- Total rack load capacity: 953 kg (2101 lb)
- Total rack weight (maximum): 1127 kg (2484.6 lb)

The ThinkAgile SXN3000 25U model has the following dimensions and weight (approximate):

- Height: 1244 mm (49.0 in)
- Width: 605 mm (23.8 in)
- Depth: 1000 mm (39.4 in)
- Total rack load capacity: 570 kg (1256.6 lb)
- Total rack weight (maximum): 670 kg (1477.1 lb)

Operating environment

The ThinkAgile SX for Nutanix is supported in the following environment:

- Air temperature: 10 °C - 35 °C (50 °F - 95 °F);
- Humidity: 10% to 80% (non-condensing)
- Power load (rated maximum):
  - SXN3000 25U (fully configured solution): 23 728 W
  - SXN3000 42U (fully configured solution): 46 256 W
- Heat output (maximum):
  - SXN3000 25U (fully configured solution): 80 959 BTU/hour
  - SXN3000 42U (fully configured solution): 157 823 BTU/hour

Note: Certain configurations may support 5 °C - 40 °C (41 °F - 104 °F) if they meet the following conditions:

- No HX3520-G appliances.
- No processors with TDP more than or equal to 125 W (HX3720 only) or 150 W (except HX3720).
- No Intel Xeon Gold 6126 processors.

The following table lists maximum power load and heat output for the ThinkAgile SX for Nutanix solution components.

Table 24. Rated system power and system heat output

Component	Maximum power load per system (200 - 240 V AC)	System heat output
Appliances with 550 W Platinum power supplies	704 W	2402 BTU/hour
Appliances with 750 W Platinum power supplies	958 W	3269 BTU/hour
Appliances with 750 W Titanium power supplies	949 W	3238 BTU/hour
Appliances with 1100 W Platinum power supplies	1408 W	4804 BTU/hour
HX3520-G	2068 W	7056 BTU/hour
HX3720 (HX Series enclosure)	2610 W	8905 BTU/hour
G8052	200 W	683 BTU/hour
G8272	360 W	1024 BTU/hour
NE1072T	320 W	1092 BTU/hour
NE2572	500 W	1706 BTU/hour

Related publications and links

For more information, see these resources:

- Lenovo ThinkAgile SX for Nutanix product page
  https://www3.lenovo.com/us/en/p/WMD00000325
- Lenovo Data Center Solution Configurator (DCSC):
  http://dcsc.lenovo.com

Related product families

Product families related to this document are the following:

- Hyperconverged Infrastructure
- Hyperconverged Infrastructure
- Nutanix Alliance

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