

ThinkSystem NVIDIA A40 48GB PCIe Gen4 Passive GPU

Product Guide (withdrawn product)

The NVIDIA A40 is a powerful data center GPU for visual computing, delivering high performance and capabilities to professionals for graphics-based workloads such as ray traced rendering, high-performance virtual workstations, simulation, 3D design, VR, and virtual production. The A40 GPU is a graphics-based virtualization solution for designers, engineers, scientists, and creatives that need this performance from anywhere in the world.

The third-generation Tensor Core technology supports a broad range of math precisions providing a unified workload accelerator for data analytics, AI training, AI inference, and HPC. Accelerating both scale-up and scale-out workloads on one platform enables elastic data centers that can dynamically adjust to shifting application workload demands. This simultaneously boosts throughput and drives down the cost of data centers.



Figure 1. ThinkSystem NVIDIA A40 48GB PCIe Gen4 Passive GPU

Did you know?

The NVIDIA A40 GPU is a high-performance GPU that offers local DisplayPort video. It supports up to four 5K monitors at 60Hz, or dual 8K displays at 60Hz per card, using Display Stream Compression (DSC). The NVIDIA A40 supports HDR color for 4K at 60Hz for 10/12b HEVC decode and up to 4K at 60Hz for 10b HEVC encode. Each DisplayPort connector can drive ultra-high resolutions of 4096x2160 at 120 Hz with 30-bit color.

Part number information

The following table shows the part numbers for the NVIDIA A40 GPU.

Withdrawn: The NVIDIA A40 GPU is withdrawn from marketing.

Table 1. Ordering information

Part number	Feature code	Description	Controlled GPU status
CTO only	BEL4	ThinkSystem NVIDIA A40 48GB PCIe Gen4 Passive GPU	Controlled
4X67A72593	BQZQ	ThinkSystem NVIDIA A40 48GB PCIe Gen4 Passive GPU w/o CEC	Controlled
4X67A71309	BG3F	ThinkSystem NVIDIA Ampere NVLink 2-Slot Bridge (1 per pair of GPUs)	-

The NVIDIA A40 GPU is Controlled which means the GPU is not offered in certain markets, as determined by the US Government.

The PCIe option part numbers includes the following:

- One NVIDIA A40 GPU with full-height (3U) adapter bracket attached
- Documentation

GPUs without a CEC chip: The NVIDIA A40 GPU is offered without a CEC chip (look for "w/o CEC" in the name). The CEC is a secondary Hardware Root of Trust (RoT) module that provides an additional layer of security, which can be used by customers who have high regulatory requirements or high security standards. NVIDIA uses a multi-layered security model and hence the protection offered by the primary Root of Trust embedded in the GPU is expected to be sufficient for most customers. The CEC defeatured products still offer Secure Boot, Secure Firmware Update, Firmware Rollback Protection, and In-Band Firmware Update Disable. Specifically, without the CEC chip, the GPU does not support Key Revocation or Firmware Attestation. CEC and non-CEC GPUs of the same type of GPU can be mixed in field upgrades.

Features

The ThinkSystem NVIDIA A40 48GB PCIe Gen4 Passive GPU offers the following features:

- **NVIDIA Ampere Architecture**
NVIDIA A40 is the world's most powerful data center GPU for visual computing, offering high performance real-time ray tracing, AI-accelerated compute, and professional graphics rendering. Building upon the major enhancements from the Turing GPU, the NVIDIA Ampere architecture enhances ray tracing operations, tensor matrix operations, and concurrent executions of FP32 and INT32 operations.
- **CUDA Cores**
The NVIDIA Ampere architecture's CUDA cores bring up to 2X the single-precision floating point (FP32) throughput compared to the previous generation, providing significant performance improvements for graphics workflows such as 3D model development and compute for workloads such as desktop simulation for computer-aided engineering (CAE).

- 2nd Generation RT Cores

Incorporating 2nd generation ray tracing engines, the NVIDIA Ampere architecture provides incredible ray traced rendering performance. A single NVIDIA A40 board can render complex professional models with physically accurate shadows, reflections, and refractions to empower users with instant insight.

Working in concert with applications leveraging APIs such as NVIDIA OptiX, Microsoft DXR and Vulkan ray tracing, servers based on NVIDIA A40 will power truly interactive design workflows to provide immediate feedback for unprecedented levels of productivity. NVIDIA A40 is up to 2x faster in ray tracing compared to the previous generation. This technology also speeds up the rendering of ray-traced motion blur for faster results with greater visual accuracy.

- 3rd Generation Tensor Cores

Purpose-built for deep learning matrix arithmetic at the heart of neural network training and inferencing functions, the NVIDIA A40 includes enhanced Tensor Cores that accelerate more datatypes (TF32 and BF16) and includes a new Fine-Grained Structured Sparsity feature that delivers up to 2X throughput for tensor matrix operations compared to the previous generation.

- High Speed GDDR6 Memory

Built with 48GB GDDR6 memory, the NVIDIA A40 provides the industry's largest graphics memory footprint to address the largest datasets and models in latency-sensitive professional applications.

- Error Correcting Code (ECC) on Graphics Memory

Meet strict data integrity requirements for mission critical applications with uncompromised computing accuracy and reliability.

- 5th Generation NVDEC Engine

NVDEC, implemented in concert with software applications, is well suited for transcoding and video playback applications for real-time decoding. The following video codecs are supported for hardware-accelerated decoding: MPEG-2, VC-1, H.264 (AVCHD), H.265 (HEVC), VP8, VP9, and AV1. Pairing this technology with NVIDIA Ampere architecture- based Tensor Cores, the A40 can quickly apply AI and inferencing to real-time video.

- 7th Generation NVENC Engine

NVENC can take on the most demanding 4K or 8K video encoding tasks to free up the graphics engine and the CPU for other operations. NVENC also enables virtual workstations to stream up to 8K content for high fidelity design and rendering workloads. In addition, the NVIDIA A40 provides better encoding quality than software-based x264 encoders.

- Preemption

Preemption at the instruction-level provides finer grain control over compute and graphics tasks to prevent longer-running applications from either monopolizing system resources or timing out.

- Multi-GPU technology - 3rd Generation NVIDIA NVLink

Connect two NVIDIA A40 cards with NVLink to double the effective memory footprint and scale application performance by enabling GPU-to-GPU data transfers at rates up to 112.5 GB/s (total bandwidth).

- DisplayPort 1.4a

Supports up to four 5K monitors at 60Hz, or dual 8K displays at 60Hz per card. The NVIDIA A40 supports HDR color for 4K at 60Hz for 10/12b HEVC decode and up to 4K at 60Hz for 10b HEVC encode. Each DisplayPort connector can drive ultra-high resolutions of 4096x2160 at 120 Hz with 30-bit color.

A40 is configured for virtualization by default with physical display connectors disabled. The display outputs can be enabled via management software tools. See Lenovo support tip HT512536 for details: <https://datacentersupport.lenovo.com/us/en/solution/ht512536>

DisplayPort 1.4a supports 8K at 60Hz over a single cable using Display Stream Compression (DSC). The A40 has 3 DisplayPort 1.4a connectors, DSC capable 8K displays are required for the A40 to drive two 8K displays.

- NVIDIA Quadro® Mosaic Technology

Transparently scale the desktop and applications across up to 12 displays from 4 GPUs while delivering full performance and image quality.

- NVIDIA Quadro Sync II

Synchronize the display and image output of up to 24 displays from 8 GPUs (connected through two Sync II boards) in a single system, reducing the number of machines needed to create an advanced video visualization environment. For more information, see the NVIDIA Quadro Sync page, <https://www.nvidia.com/en-us/design-visualization/solutions/quadro-sync/>

- Frame Lock Connector Latch

Each frame lock connector is designed with a self-locking retention mechanism to secure its connection with the frame lock cable to provide robust connectivity and maximum productivity.

Technical specifications

The following table lists the NVIDIA A40 GPU specifications.

Table 2. A40 specifications

Feature	Specification
GPU Architecture	NVIDIA Ampere
NVIDIA CUDA Parallel Processing Cores	10,752
NVIDIA Tensor Cores (3rd gen)	336
NVIDIA RT Cores (2nd Gen)	84
Peak FP32 performance (non-Tensor)	37.4 TFLOPS
Peak FP16 Tensor performance with FP16 Accumulate	149.7 TFLOPS, 299.4 TFLOPS*
Peak Tensor Float 32 (TF32) performance	74.8 TFLOPS, 149.6 TFLOPS*
Peak Bfloat16 (BF16) performance with FP32 Accumulate	149.7 TFLOPS, 299.4 TFLOPS*
Peak Integer Performance	INT8: 299.3 TOPS, 598.6 TOPS* INT4: 598.7 TOPS, 1197.4 TOPS*
RT Core performance	73.1 TFLOPS
GPU Memory	48 GB GDDR6
Memory Bandwidth	696 GB/s
ECC	Yes
Interconnect Bandwidth	NVIDIA NVLink 112.5 GB/s (bidirectional) PCIe Gen4 x16 31.5 GB/s (bidirectional)
System Interface	PCIe Gen 4, x16 lanes
Form Factor	PCIe full height/length, double width (10.5" x 4.4")
NVLink support	Yes; 1 NVLink Bridge supported per pair of GPUs
Multi-Instance GPU (MIG)	No support
Max Power Consumption	300 W
Thermal Solution	Passive
vGPU Software Support	NVIDIA GRID®, NVIDIA Quadro® Virtual Data Center Workstation, NVIDIA Virtual Compute Server
vGPU Profiles Supported	1 GB, 2 GB, 3 GB, 4 GB, 6 GB, 8 GB, 12 GB, 16 GB, 24 GB, 48 GB
Display connectors	3x DisplayPort 1.4a (disabled by default**)
Max Simultaneous Displays	4x 5K monitors @ 60Hz, or 2x 8K displays @ 60Hz
Max DP 1.4 Resolution	4096x2160 @ 120 Hz with 30-bit color
Graphics APIs	DirectX 12.07, Shader Model 5.17, OpenGL 4.68, Vulkan 1.18
Compute APIs	CUDA, DirectCompute, OpenCL, OpenACC

* With structural sparsity enabled

** To enable the DisplayPort ports, see <https://datacentersupport.lenovo.com/us/en/solution/ht512536>

Server support

The following tables list the ThinkSystem servers that are compatible.

Table 3. Server support (Part 1 of 5)

Part Number	Description	AMD V3				2S Intel V3/V4						Multi Node V3	1S V3				
		SR635 V3 (7D9H / 7D9G)	SR655 V3 (7D9F / 7D9E)	SR645 V3 (7D9D / 7D9C)	SR665 V3 (7D9B / 7D9A)	ST650 V3 (7D7B / 7D7A)	SR630 V3 (7D72 / 7D73)	SR650 V3 (7D75 / 7D76)	SR630 V4 (7D68 / 7D69)	SR650 V4 (7D6C / 7D6D)	SR650a V4 (7D6C / 7D6D)	SD535 V3 (7DD8 / 7DD1)	SD530 V3 (7DDA / 7DD3)	SD550 V3 (7DD9 / 7DD2)	ST45 V3 (7DH4 / 7DH5)	ST50 V3 (7DF4 / 7DF3)	ST250 V3 (7DCF / 7DCE)
4X67A72593	ThinkSystem NVIDIA A40 48GB PCIe Gen4 Passive GPU w/o CEC	N	3	N	3	N	N	3	N	N	N	N	N	N	N	N	N
4X67A71309	ThinkSystem NVIDIA Ampere NVLink 2-Slot Bridge	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Table 4. Server support (Part 2 of 5)

Part Number	Description	4S 8S Intel V3/V4						GPU Rich						Edge					
		SR850 V3 (7D97 / 7D96)	SR860 V3 (7D94 / 7D93)	SR950 V3 (7DC5 / 7DC4)	SR850 V4 (7DJT / 7DJS)	SR860 V4 (7DJQ / 7DJN)	SR670 V2 (7Z22 / 7Z23)	SR675 V3 (7D9Q / 7D9R)	SR680a V3 (7DHE)	SR680a V3 B200 (7DM9)	SR685a V3 (7DHC)	SR780a V3 (7DJ5)	SR680a V4 (7DMK)	SE100 (7DGR)	SE350 (7Z46 / 7D1X)	SE350 V2 (7DA9)	SE360 V2 (7DAM)	SE450 (7D8T)	SE455 V3 (7DBY)
4X67A72593	ThinkSystem NVIDIA A40 48GB PCIe Gen4 Passive GPU w/o CEC	N	N	N	N	N	8 ¹	8	N	N	N	N	N	N	N	N	N	2 ²	N
4X67A71309	ThinkSystem NVIDIA Ampere NVLink 2-Slot Bridge	N	N	N	N	N	Y	Y	N	N	N	N	N	N	N	N	N	N	N

1. DisplayPort ports not supported and are disabled

2. Double-wide GPUs are only supported in the SE450 with the 360mm chassis; not supported in the 300mm chassis

Table 5. Server support (Part 3 of 5)

Part Number	Description	Super Computing							1S Intel V2		2S Intel V2		AMD V1				
		SC750 V4 (7DDJ)	SC777 V4 (7DKA)	SD665 V3 (7D9P)	SD665-N V3 (7DAZ)	SD650 V3 (7D7M)	SD650-I V3 (7D7L)	SD650-N V3 (7D7N)	ST50 V2 (7D8K / 7D8J)	ST250 V2 (7D8G / 7D8F)	SR250 V2 (7D7R / 7D7Q)	ST650 V2 (7Z75 / 7Z74)	SR630 V2 (7Z70 / 7Z71)	SR650 V2 (7Z72 / 7Z73)	SR635 (7Y98 / 7Y99)	SR655 (7Y00 / 7Z01)	SR645 (7D2Y / 7D2X)
4X67A72593	ThinkSystem NVIDIA A40 48GB PCIe Gen4 Passive GPU w/o CEC	N	N	N	N	N	N	N	N	N	N	N	3 ¹	N	2	N	3
4X67A71309	ThinkSystem NVIDIA Ampere NVLink 2-Slot Bridge	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N

1. DisplayPort ports not supported and are disabled

Table 6. Server support (Part 4 of 5)

Part Number	Description	Dense V2				4S V2	8S	4S V1		1S Intel V1					
		SD630 V2 (7D1K)	SD650 V2 (7D1M)	SD650-N V2 (7D1N)	SN550 V2 (7Z69)	SR850 V2 (7D31 / 7D32)	SR860 V2 (7Z59 / 7Z60)	SR950 (7X11 / 7X12)	SR850 (7X18 / 7X19)	SR850P (7D2F / 2D2G)	SR860 (7X69 / 7X70)	ST50 (7Y48 / 7Y50)	ST250 (7Y45 / 7Y46)	SR150 (7Y54)	SR250 (7Y52 / 7Y51)
4X67A72593	ThinkSystem NVIDIA A40 48GB PCIe Gen4 Passive GPU w/o CEC	N	N	N	N	N	N	N	N	N	N	N	N	N	N
4X67A71309	ThinkSystem NVIDIA Ampere NVLink 2-Slot Bridge	N	N	N	N	N	N	N	N	N	N	N	N	N	N

Table 7. Server support (Part 5 of 5)

Part Number	Description	2S Intel V1							Dense V1				
		ST550 (7X09 / 7X10)	SR530 (7X07 / 7X08)	SR550 (7X03 / 7X04)	SR570 (7Y02 / 7Y03)	SR590 (7X98 / 7X99)	SR630 (7X01 / 7X02)	SR650 (7X05 / 7X06)	SR670 (7Y36 / 7Y37)	SD530 (7X21)	SD650 (7X58)	SN550 (7X16)	SN850 (7X15)
4X67A72593	ThinkSystem NVIDIA A40 48GB PCIe Gen4 Passive GPU w/o CEC	N	N	N	N	N	N	N	4 ^{1,2}	N	N	N	N
4X67A71309	ThinkSystem NVIDIA Ampere NVLink 2-Slot Bridge	N	N	N	N	N	N	N	N	N	N	N	N

1. DisplayPort ports not supported and are disabled.

2. Only available via Lenovo Scalable Infrastructure (LeSI). Select "AI & HPC – LeSI Solutions" in the DCSC configurator. See the [LeSI product guide](#) for details.

Operating system support

The following table lists the supported operating systems:

Tip: These tables are automatically generated based on data from [Lenovo ServerProven](#).

Table 8. Operating system support for ThinkSystem NVIDIA A40 48GB PCIe 4.0 Passive GPU w/o CEC, 4X67A72593

Operating systems	SR655	SR665	SR665 V3	SR650 V2	SR670 (Xeon Gen 1)	SR670 (Xeon Gen 2)	SR670 V2	SE450	SR650 V3 (4th Gen Xeon)	SR655 V3	SR675 V3	SR650 V3 (5th Gen Xeon)
Microsoft Windows 10	Y ¹	N	Y	N	N	N	N	N	N	Y	N	Y
Microsoft Windows 11	Y	N	Y	N	N	N	N	N	N	Y	N	Y
Microsoft Windows Server 2016	Y	Y	N	Y	N	N	Y	N	N	N	N	N
Microsoft Windows Server 2019	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2022	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Microsoft Windows Server 2025	N	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N
Red Hat Enterprise Linux 7.7	Y ²	Y ²	N	N	Y	Y	N	N	N	N	N	N
Red Hat Enterprise Linux 7.8	Y ²	Y ²	N	N	Y	Y	N	N	N	N	N	N
Red Hat Enterprise Linux 7.9	Y ²	Y ²	N	Y	Y	Y	Y	Y	N	N	N	N
Red Hat Enterprise Linux 8.0	Y ²	N	N	N	Y	Y	N	N	N	N	N	N
Red Hat Enterprise Linux 8.1	Y ²	Y ²	N	N	Y	Y	N	N	N	N	N	N
Red Hat Enterprise Linux 8.2	Y ²	Y ²	N	Y	Y	Y	Y	N	N	N	N	N
Red Hat Enterprise Linux 8.3	Y	Y	N	Y	Y	Y	Y	N	N	N	N	N
Red Hat Enterprise Linux 8.4	Y	Y	N	Y	Y	Y	Y	Y	N	N	N	N
Red Hat Enterprise Linux 8.5	Y	Y	N	Y	Y	Y	Y	Y	N	N	N	N
Red Hat Enterprise Linux 8.6	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
Red Hat Enterprise Linux 8.7	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
Red Hat Enterprise Linux 8.8	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.9	Y	Y	Y	Y	N	Y	Y	N	Y	Y	N	Y
Red Hat Enterprise Linux 8.10	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N
Red Hat Enterprise Linux 9.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
Red Hat Enterprise Linux 9.1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
Red Hat Enterprise Linux 9.2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.3	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	N	Y
Red Hat Enterprise Linux 9.4	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N
Red Hat Enterprise Linux 9.5	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N
Red Hat Enterprise Linux 9.6	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N
Red Hat Enterprise Linux 10.0	N	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N

	SR655	SR665	SR665 V3	SR650 V2	SR670 (Xeon Gen 1)	SR670 (Xeon Gen 2)	SR670 V2	SE450	SR650 V3 (4th Gen Xeon)	SR655 V3	SR675 V3	SR650 V3 (5th Gen Xeon)
Operating systems												
SUSE Linux Enterprise Server 15 SP1	Y ²	Y ²	N	N	Y	Y	N	N	N	N	N	N
SUSE Linux Enterprise Server 15 SP2	Y	Y	N	Y	Y	Y	Y	N	N	N	N	N
SUSE Linux Enterprise Server 15 SP3	Y	Y	N	Y	Y	Y	Y	N	N	N	N	N
SUSE Linux Enterprise Server 15 SP4	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
SUSE Linux Enterprise Server 15 SP5	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	Y
SUSE Linux Enterprise Server 15 SP6	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N
SUSE Linux Enterprise Server 15 SP7	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N
Ubuntu 18.04.5 LTS or later with HWE kernel	N	N	N	Y	N	N	Y	N	N	N	N	N
Ubuntu 18.04.6 LTS or later with HWE kernel	N	N	N	N	N	N	N	Y	N	N	N	N
Ubuntu 20.04.5 LTS or later with HWE kernel	N	N	Y	N	N	N	N	Y	N	Y	Y	N
Ubuntu 20.04 LTS or later with HWE kernel	N	N	N	Y	N	N	N	N	N	N	N	N
Ubuntu 22.04.5 LTS or later with HWE kernel	N	N	Y	N	N	N	N	N	N	N	N	N
Ubuntu 22.04 LTS or later with HWE kernel	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y ³
Ubuntu 24.04 LTS or later with HWE kernel	Y	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N
VMware vSphere Hypervisor (ESXi) 6.5 U3	Y ²	N	N	N	N	N	N	N	N	N	N	N
VMware vSphere Hypervisor (ESXi) 6.7 U3	Y	Y	N	Y	Y	Y	Y	N	N	N	N	N
VMware vSphere Hypervisor (ESXi) 7.0	Y ²	Y ²	N	N	Y	Y	N	N	N	N	N	N
VMware vSphere Hypervisor (ESXi) 7.0 U1	Y ²	Y	N	N	Y	Y	N	N	N	N	N	N
VMware vSphere Hypervisor (ESXi) 7.0 U2	Y	Y	N	Y	Y	Y	Y	N	N	N	N	N
VMware vSphere Hypervisor (ESXi) 7.0 U3	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
VMware vSphere Hypervisor (ESXi) 8.0 U1	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N
VMware vSphere Hypervisor (ESXi) 8.0 U2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0 U3	N	Y	Y	Y	N	N	N	Y	Y	Y	N	N
VMware vSphere Hypervisor (ESXi) 9.0	N	Y	Y	Y	N	N	N	Y	Y	Y	N	N

¹ ISG will not sell/preload this OS, but compatibility and cert only.

² The OS is not supported with EPYC 7003 processors.

³ Ubuntu 22.04.3 LTS/Ubuntu 22.04.4 LTS

NVIDIA GPU software

This section lists the NVIDIA software that is available from Lenovo.

- [NVIDIA vGPU Software \(vApps, vPC, RTX vWS\)](#)
- [NVIDIA Omniverse Software \(OVE\)](#)
- [NVIDIA Enterprise Software](#)
- [NVIDIA HPC Compiler Software](#)

NVIDIA vGPU Software (vApps, vPC, RTX vWS)

Lenovo offers the following virtualization software for NVIDIA GPUs:

- **Virtual Applications (vApps)**

For organizations deploying Citrix XenApp, VMware Horizon RDSH or other RDSH solutions. Designed to deliver PC Windows applications at full performance. NVIDIA Virtual Applications allows users to access any Windows application at full performance on any device, anywhere. This edition is suited for users who would like to virtualize applications using XenApp or other RDSH solutions. Windows Server hosted RDSH desktops are also supported by vApps.

- **Virtual PC (vPC)**

This product is ideal for users who want a virtual desktop but need great user experience leveraging PC Windows® applications, browsers and high-definition video. NVIDIA Virtual PC delivers a native experience to users in a virtual environment, allowing them to run all their PC applications at full performance.

- **NVIDIA RTX Virtual Workstation (RTX vWS)**

NVIDIA RTX vWS is the only virtual workstation that supports NVIDIA RTX technology, bringing advanced features like ray tracing, AI-denoising, and Deep Learning Super Sampling (DLSS) to a virtual environment. Supporting the latest generation of NVIDIA GPUs unlocks the best performance possible, so designers and engineers can create their best work faster. IT can virtualize any application from the data center with an experience that is indistinguishable from a physical workstation — enabling workstation performance from any device.

The following license types are offered:

- **Perpetual license**

A non-expiring, permanent software license that can be used on a perpetual basis without the need to renew. For each perpetual license, customers are also required to purchase a 5-year SUMS support contract. Without this contract, the perpetual license cannot be ordered.

- **Annual subscription**

A software license that is active for a fixed period as defined by the terms of the subscription license, typically yearly. The subscription includes Support, Upgrade and Maintenance (SUMS) for the duration of the license term.

- **Concurrent User (CCU)**

A method of counting licenses based on active user VMs. If the VM is active and the NVIDIA vGPU software is running, then this counts as one CCU. A vGPU CCU is independent of the connection to the VM.

The following table lists the ordering part numbers and feature codes.

Table 9. NVIDIA vGPU Software

Part number	Feature code 7S02CTO1WW	NVIDIA part number	Description
NVIDIA vApps offerings			
7S02005TWW	SEGS	711-VAP001+P3CMI00	vAPPS Perpetual License 1CCU + 5 Years SUMS 1CCU
7S020046WW	SDHB	711-VAP001+P3CMI00	NVIDIA vApps Perpetual License, 1 CCU
7S020003WW	B1MP	712-VAP003+P3CMI60	NVIDIA vApps SUMS ONLY 5Yr, 1 CCU
7S020004WW	B1MQ	711-VAP002+P3CMI12	NVIDIA vApps Subscription License 1 Year, 1 CCU
7S020005WW	B1MR	711-VAP002+P3CMI36	NVIDIA vApps Subscription License 3 Years, 1 CCU
7S02003DWW	S832	711-VAP002+P3CMI48	NVIDIA vApps Subscription License 4 Years, 1 CCU
7S02003EWW	S833	711-VAP002+P3CMI60	NVIDIA vApps Subscription License 5 Years, 1 CCU
NVIDIA vPC offerings			
7S02005UWW	SEGT	711-VPC021+P3CMI00	vPC Perpetual License 1CCU + 5 Years SUMS 1CCU
7S020047WW	SDHC	711-VPC021+P3CMI00	NVIDIA vPC Perpetual License, 1 CCU
7S020009WW	B1MV	712-VPC003+P3CMI60	NVIDIA vPC SUMS 5Yr ONLY, 1 CCU
7S02000AWW	B1MW	711-VPC022+P3CMI12	NVIDIA vPC Subscription License 1 Year, 1 CCU
7S02000BWW	B1MX	711-VPC022+P3CMI36	NVIDIA vPC Subscription License 3 Years, 1 CCU
7S02003FWW	S834	711-VPC022+P3CMI48	NVIDIA vPC Subscription License 4 Years, 1 CCU
7S02003GWW	S835	711-VPC022+P3CMI60	NVIDIA vPC Subscription License 5 Years, 1 CCU
NVIDIA RTX vWS offerings			
7S02005VWW	SEGU	711-DWS021+P3CMI00	vWS Perpetual License 1CCU + 5 Years SUMS 1CCU
7S02005WWW	SEGV	711-DWS021+P3EDI00	vWS EDU Perpetual License 1CCU + 5 Years EDU SUMS 1CCU
7S020048WW	SDHD	711-DWS021+P3CMI00	NVIDIA RTX vWS Perpetual License, 1 CCU
7S02000FWW	B1N1	712-DWS003+P3CMI60	NVIDIA RTX vWS SUMS ONLY 5Yr, 1 CCU
7S020049WW	SDHE	711-DWS021+P3EDI00	NVIDIA RTX vWS EDU Perpetual License, 1 CCU
7S02000LWW	B1N6	712-DWS003+P3EDI60	NVIDIA RTX vWS EDU SUMS ONLY 5Y, 1CCU
7S02000GWW	B1N2	711-DWS022+P3CMI12	NVIDIA RTX vWS Subsc Lic 1Yr 1 CCU
7S02000HWW	B1N3	711-DWS022+P3CMI36	NVIDIA RTX vWS Subscription License 3 Years, 1 CCU
7S02000XWW	S6YJ	711-DWS022+P3CMI48	NVIDIA RTX vWS Subscription License 4 Years, 1 CCU
7S02000YWW	S6YK	711-DWS022+P3CMI60	NVIDIA RTX vWS Subscription License 5 Years, 1 CCU
7S02000MWW	B1N7	711-DWS022+P3EDI12	NVIDIA RTX vWS EDU Subscription License 1 Year, 1 CCU
7S02000NWW	B1N8	711-DWS022+P3EDI36	NVIDIA RTX vWS EDU Subscription License 3 Years, 1 CCU
7S02003BWW	S830	711-DWS022+P3EDI48	NVIDIA RTX vWS EDU Subscription License 4 Years, 1 CCU
7S02003CWW	S831	711-DWS022+P3EDI60	NVIDIA RTX vWS EDU Subscription License 5 Years, 1 CCU
NVIDIA RTX vWS Support & Services			
7S020015WW	S6YS	712-DWSA24+P3CMI12	24X7 Support Services for NVIDIA RTX vWS Production SUMS, 1CCU, 1 Year
7S02005CWW	SDZB	712-DWSA24+P3CMI60	24X7 Support Services for NVIDIA RTX vWS Production SUMS 1CCU 5 Years

Part number	Feature code 7S02CTO1WW	NVIDIA part number	Description
7S020016WW	S6YT	712-DWSA24+P3EDI12	24X7 Support Services for NVIDIA RTX vWS Production SUMS, 1CCU, EDU, 1 Year
7S02005DWW	SDZC	712-DWSA24+P3EDI60	24X7 Support Services for NVIDIA RTX vWS Production SUMS 1CCU EDU 5 Years
7S02005EWW	SDZD	712-DWSB24+P3CMI12	24X7 Support Services for NVIDIA RTX vWS SUMS 4 CCU 1 Year
7S020017WW	S6YU	712-DWSD24+P3CMI12	24X7 Support Services for NVIDIA RTX vWS Subscription License, 1CCU, 1 Year

NVIDIA Omniverse Software (OVE)

NVIDIA Omniverse™ Enterprise is an end-to-end collaboration and simulation platform that fundamentally transforms complex design workflows, creating a more harmonious environment for creative teams.

NVIDIA and Lenovo offer a robust, scalable solution for deploying Omniverse Enterprise, accommodating a wide range of professional needs. This document details the critical components, deployment options, and support available, ensuring an efficient and effective Omniverse experience.

Deployment options cater to varying team sizes and workloads. Using Lenovo NVIDIA-Certified Systems™ and Lenovo OVX nodes which are meticulously designed to manage scale and complexity, ensures optimal performance for Omniverse tasks.

Deployment options include:

- Workstations: NVIDIA-Certified Workstations with RTX 6000 Ada GPUs for desktop environments.
- Data Center Solutions: Deployment with Lenovo OVX nodes or NVIDIA-Certified Servers equipped with A40, L40, or L40S GPUs for centralized, high-capacity needs.

NVIDIA Omniverse Enterprise includes the following components and features:

- Platform Components: Kit, Connect, Nucleus, Simulation, RTX Renderer.
- Foundation Applications: USD Composer, USD Presenter.
- Omniverse Extensions: Connect Sample & SDK.
- Integrated Development Environment (IDE)
- Nucleus Configuration: Workstation, Enterprise Nucleus Server (supports up to 8 editors per scene); Self-Service Public Cloud Hosting using Containers.
- Omniverse Farm: Supports batch workloads up to 8 GPUs.
- Enterprise Services: Authentication (SSO/SSL), Navigator Microservice, Large File Transfer, User Accounts SAML/Account Directory.
- User Interface: Workstation & IT Managed Launcher.
- Support: NVIDIA Enterprise Support.
- Deployment Scenarios: Desktop to Data Center: Workstation deployment for building and designing, with options for physical or virtual desktops. For batch tasks, rendering, and SDG workloads that require headless compute, Lenovo OVX nodes are recommended.

The following part numbers are for a subscription license which is active for a fixed period as noted in the description. The license is for a named user which means the license is for named authorized users who may not re-assign or share the license with any other person.

Table 10. NVIDIA Omniverse Software (OVE)

Part number	Feature 7S02CTO1WW	NVIDIA part number	Description
7S02003ZWW	SCX0	721-OV7006+P3CMI12	NVIDIA Omniverse Enterprise Subscription per GPU, 1 Year
7S020042WW	SCX3	721-OV7006+P3CMI36	NVIDIA Omniverse Enterprise Subscription per GPU, 3 Years
7S020044WW	SD5T	721-OV7006+P3CMI60	NVIDIA Omniverse Enterprise Subscription per GPU, 5 Year
7S020041WW	SCX2	721-OV7006+P3INI12	NVIDIA Omniverse Enterprise Subscription per GPU, INC, 1 Year
7S020040WW	SCX1	721-OV7006+P3EDI12	NVIDIA Omniverse Enterprise Subscription per GPU, EDU, 1 Year
7S020043WW	SCX4	721-OV7006+P3EDI36	NVIDIA Omniverse Enterprise Subscription per GPU, EDU, 3 Years
7S020045WW	SD5U	721-OV7006+P3EDI60	NVIDIA Omniverse Enterprise Subscription per GPU EDU, 5 Year

NVIDIA Enterprise Software

Lenovo offers the NVIDIA Enterprise cloud-native enterprise software, comprised of NVIDIA AI Enterprise (NVAIE) and NVIDIA Omniverse Enterprise. NVIDIA Enterprise is an end-to-end, cloud-native suite of AI and data analytics software, optimized, certified, and supported by NVIDIA to run on VMware vSphere and bare-metal with NVIDIA-Certified Systems™. It includes key enabling technologies from NVIDIA for rapid deployment, management, and scaling of AI workloads in the modern hybrid cloud.

NVIDIA Enterprise is licensed on a per-GPU basis. NVIDIA Enterprise products can be purchased as either a perpetual license with support services, or as an annual or multi-year subscription.

- The perpetual license provides the right to use the NVIDIA Enterprise software indefinitely, with no expiration. NVIDIA Enterprise with perpetual licenses must be purchased in conjunction with one-year, three-year, or five-year support services. A one-year support service is also available for renewals.
- The subscription offerings are an affordable option to allow IT departments to better manage the flexibility of license volumes. NVIDIA Enterprise software products with subscription includes support services for the duration of the software’s subscription license

The features of NVIDIA Enterprise Software are listed in the following table.

Table 11. Features of NVIDIA Enterprise Software

Features	Supported in NVIDIA Enterprise
Per GPU Licensing	Yes
Compute Virtualization	Supported
Windows Guest OS Support	No support
Linux Guest OS Support	Supported
Maximum Displays	1
Maximum Resolution	4096 x 2160 (4K)
OpenGL and Vulkan	In-situ Graphics only
CUDA and OpenCL Support	Supported
ECC and Page Retirement	Supported

Features	Supported in NVIDIA Enterprise
MIG GPU Support	Supported
Multi-vGPU	Supported
NVIDIA GPUDirect	Supported
Peer-to-Peer over NVLink	Supported
GPU Pass Through Support	Supported
Baremetal Support	Supported
AI and Data Science applications and Frameworks	Supported
Cloud Native ready	Supported

Note: Maximum 10 concurrent VMs per product license

The following table lists the ordering part numbers and feature codes.

Table 12. NVIDIA Enterprise Software

Part number	Feature code 7S02CTO1WW	Description	NVIDIA part number
AI Enterprise Perpetual License			
7S02001BWW	S6YY	NVIDIA Enterprise (NVIDIA AI Enterprise and NVIDIA Omniverse Enterprise) Perpetual License & Support per GPU, 5 Years	731-AI7004+P3CMI60
7S02001EWW	S6Z1	NVIDIA Enterprise (NVIDIA AI Enterprise and NVIDIA Omniverse Enterprise) Perpetual License & Support per GPU, EDU, 5 Years	731-AI7004+P3EDI60
AI Enterprise Subscription License			
7S02001FWW	S6Z2	NVIDIA Enterprise (NVIDIA AI Enterprise and NVIDIA Omniverse Enterprise) Subscription per GPU, 1 Year	731-AI7003+P3CMI12
7S02005XWW	SENY	NVIDIA Enterprise (NVIDIA AI Enterprise and NVIDIA Omniverse Enterprise) Subscription per GPU, 2 Years	731-AI7003+P3CMI24
7S02001GWW	S6Z3	NVIDIA Enterprise (NVIDIA AI Enterprise and NVIDIA Omniverse Enterprise) Subscription per GPU, 3 Year	731-AI7003+P3CMI36
7S02005YWW	SENZ	NVIDIA Enterprise (NVIDIA AI Enterprise and NVIDIA Omniverse Enterprise) Subscription per GPU, 4 Years	731-AI7003+P3CMI48
7S02001HWW	S6Z4	NVIDIA Enterprise (NVIDIA AI Enterprise and NVIDIA Omniverse Enterprise) Subscription per GPU, 5 Year	731-AI7003+P3CMI60
7S02001JWW	S6Z5	NVIDIA Enterprise (NVIDIA AI Enterprise and NVIDIA Omniverse Enterprise) Subscription per GPU, EDU, 1 Year	731-AI7003+P3EDI12
7S02005ZWW	SEP0	NVIDIA Enterprise (NVIDIA AI Enterprise and NVIDIA Omniverse Enterprise) Subscription per GPU, EDU, 2 Years	731-AI7003+P3EDI24
7S02001KWW	S6Z6	NVIDIA Enterprise (NVIDIA AI Enterprise and NVIDIA Omniverse Enterprise) Subscription per GPU, EDU, 3 Year	731-AI7003+P3EDI36
7S020060WW	SEP1	NVIDIA Enterprise (NVIDIA AI Enterprise and NVIDIA Omniverse Enterprise) Subscription per GPU, EDU, 4 Years	731-AI7003+P3EDI48
7S02001LWW	S6Z7	NVIDIA Enterprise (NVIDIA AI Enterprise and NVIDIA Omniverse Enterprise) Subscription per GPU, EDU, 5 Year	731-AI7003+P3EDI60

Part number	Feature code 7S02CTO1WW	Description	NVIDIA part number
Business Critical Support Services for NVIDIA Enterprise			
7S02001MWW	S6Z8	Business Critical Support Services for NVIDIA Enterprise (NVIDIA AI Enterprise and Omniverse Enterprise) per GPU, 1 Year	731-AI7007+P3CMI12
7S02001NWW	S6Z9	Business Critical Support Services for NVIDIA Enterprise (NVIDIA AI Enterprise and Omniverse Enterprise) per GPU, 3 Year	731-AI7007+P3CMI36
7S020061WW	SEP2	Business Critical Support Services for NVIDIA Enterprise (NVIDIA AI Enterprise and Omniverse Enterprise) per GPU, 4 Years	731-AI7007+P3CMI48
7S02001PWW	S6ZA	Business Critical Support Services for NVIDIA Enterprise (NVIDIA AI Enterprise and Omniverse Enterprise) per GPU, 5 Year	731-AI7007+P3CMI60
7S02001QWW	S6ZB	Business Critical Support Services for NVIDIA Enterprise (NVIDIA AI Enterprise and Omniverse Enterprise) per GPU, EDU, 1 Year	731-AI7007+P3EDI12
7S02001RWW	S6ZC	Business Critical Support Services for NVIDIA Enterprise (NVIDIA AI Enterprise and Omniverse Enterprise) per GPU, EDU, 3 Year	731-AI7007+P3EDI36
7S020062WW	SEP3	Business Critical Support Services for NVIDIA Enterprise (NVIDIA AI Enterprise and Omniverse Enterprise) per GPU, EDU, 4 Years	731-AI7007+P3EDI48
7S02001SWW	S6ZD	Business Critical Support Services for NVIDIA Enterprise (NVIDIA AI Enterprise and Omniverse Enterprise) per GPU, EDU, 5 Year	731-AI7007+P3EDI60

Find more information in the [NVIDIA Enterprise Sizing Guide](#).

NVIDIA HPC Compiler Software

Table 13. NVIDIA HPC Compiler

Part number	Feature code 7S09CTO6WW	Description
HPC Compiler Support Services		
7S090014WW	S924	NVIDIA HPC Compiler Support Services, 1 Year
7S090015WW	S925	NVIDIA HPC Compiler Support Services, 3 Years
7S09002GWW	S9UQ	NVIDIA HPC Compiler Support Services, 5 Years
7S090016WW	S926	NVIDIA HPC Compiler Support Services, EDU, 1 Year
7S090017WW	S927	NVIDIA HPC Compiler Support Services, EDU, 3 Years
7S09002HWW	S9UR	NVIDIA HPC Compiler Support Services, EDU, 5 Years
7S090018WW	S928	NVIDIA HPC Compiler Support Services - Additional Contact, 1 Year
7S09002JWW	S9US	NVIDIA HPC Compiler Support Services - Additional Contact, 3 Years
7S09002KWW	S9UT	NVIDIA HPC Compiler Support Services - Additional Contact, 5 Years
7S090019WW	S929	NVIDIA HPC Compiler Support Services - Additional Contact, EDU, 1 Year
7S09002LWW	S9UU	NVIDIA HPC Compiler Support Services - Additional Contact, EDU, 3 Years
7S09002MWW	S9UV	NVIDIA HPC Compiler Support Services - Additional Contact, EDU, 5 Years
HPC Compiler Premier Support Services		

Part number	Feature code 7S09CTO6WW	Description
7S09001AWW	S92A	NVIDIA HPC Compiler Premier Support Services, 1 Year
7S09002NWW	S9UW	NVIDIA HPC Compiler Premier Support Services, 3 Years
7S09002PWW	S9UX	NVIDIA HPC Compiler Premier Support Services, 5 Years
7S09001BWW	S92B	NVIDIA HPC Compiler Premier Support Services, EDU, 1 Year
7S09002QWW	S9UY	NVIDIA HPC Compiler Premier Support Services, EDU, 3 Years
7S09002RWW	S9UZ	NVIDIA HPC Compiler Premier Support Services, EDU, 5 Years
7S09001CWW	S92C	NVIDIA HPC Compiler Premier Support Services - Additional Contact, 1 Year
7S09002SWW	S9V0	NVIDIA HPC Compiler Premier Support Services - Additional Contact, 3 Years
7S09002TWW	S9V1	NVIDIA HPC Compiler Premier Support Services - Additional Contact, 5 Years
7S09001DWW	S92D	NVIDIA HPC Compiler Premier Support Services - Additional Contact, EDU, 1 Year
7S09002UWW	S9V2	NVIDIA HPC Compiler Premier Support Services - Additional Contact, EDU, 3 Years
7S09002VWW	S9V3	NVIDIA HPC Compiler Premier Support Services - Additional Contact, EDU, 5 Years

Auxiliary power cables

The A40 option part number does not ship with auxiliary power cables. Cables are server-specific due to length requirements. For CTO orders, auxiliary power cables are derived by the configurator. For field upgrades, cables will need to be ordered separately as listed in the table below.

Table 14. Auxiliary power cables for A40 (click images to show larger versions)

Auxiliary power cables needed with the SR665, SR650 V2, SR650 V3, SR655 V3, SR665 V3	
<p>360mm 8pin (2x4) cable Option*: SR665: 4M17A80478 or 4M17A11759 SR650 V2: 4H47A38666 or 4H47A80491 SR650 V3: 4X67A82883 SR655 V3: 4X67A86438 SR665 V3: 4X67A85856 Feature: BAD8 SBB: SBB7A49792 or SBB7A21691 Base: SC17A59596 FRU: 02YE420</p> <p>* The option part numbers are for thermal kits and include other components needed to install the GPU. See the server product guide for details.</p>	
Auxiliary power cable needed with the SR675 V3	
<p>235mm 8pin (2x4) cable Option: 4X97A84509, ThinkSystem SR675 V3 GPU Power Cable Kit Feature: BRGU SBB: SBB7A65297 Base: SC17B39302 FRU: 03LE555</p>	
Auxiliary power cable needed with the SE450	
<p>350mm 8pin (2x4) cable Option: 4X97A81810, ThinkEdge SE450 GPU Power Cable Feature: BMHY SBB: SBB7A50523 Base: SC17B03366 FRU: 02YF808</p>	
Auxiliary power cable needed with the SR670 V2	

215mm 8pin (2x4) cable

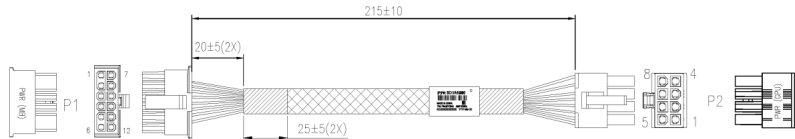
Option: 4X97A69627, ThinkSystem
SR670 V2 GPU Option Power Cable

Feature: BFNL

SBB: SBB7A40281

Base: SC17A10990

FRU: 02YE945



Auxiliary power cables supplied with the SR670 (configure-to-order)

900mm SR670 Cage 1 power cable

Feature: B3Y3

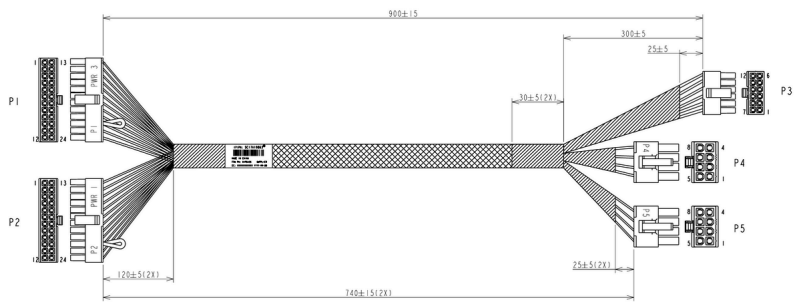
SBB: SBB7A10375

Base: SC17A10876

FRU: 01PG448

Notes:

- Feature & SBB also include PCIe data cable
- Cable also supplies power to the riser

**1100mm SR670 Cage 2 power cable**

Feature: B3Y2

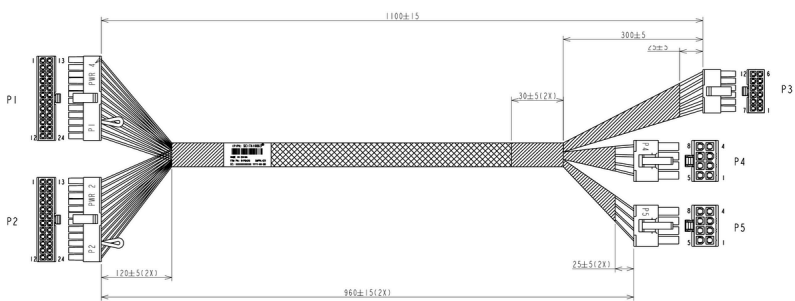
SBB: SBB7A10374

Base: SC17A10863

FRU: 01PG426

Notes:

- Feature & SBB also include PCIe data cable
- Cable also supplies power to the riser

**Regulatory approvals**

The NVIDIA A40 GPU has the following regulatory approvals:

- RCM
- BSMI
- CE
- FCC
- ICES
- KCC
- cUL, UL
- VCCI

Operating environment

The NVIDIA A40 GPU has the following operating characteristics:

- Ambient temperature
 - Operational: 0°C to 50°C (-5°C to 55°C for short term*)
 - Storage: -40°C to 75°C
- Relative humidity:
 - Operational: 5-85% (5-93% short term*)
 - Storage: 5-95%

* A period not more than 96 hours consecutive, not to exceed 15 days per year.

Warranty

One year limited warranty. When installed in a Lenovo server, the GPU assumes the server's base warranty and any warranty upgrades.

Related publications

For more information, refer to these documents:

- ThinkSystem and ThinkAgile GPU Summary:
<https://lenovopress.lenovo.com/lp0768-thinksystem-thinkagile-gpu-summary>
- ServerProven compatibility:
<https://serverproven.lenovo.com/>
- NVIDIA A40 product page:
<https://www.nvidia.com/en-us/data-center/a40/>
- NVIDIA Ampere Architecture page
<https://www.nvidia.com/en-us/data-center/ampere-architecture/>

Related product families

Product families related to this document are the following:

- [GPU adapters](#)

Notices

Lenovo may not offer the products, services, or features discussed in this document in all countries. Consult your local Lenovo representative for information on the products and services currently available in your area. Any reference to a Lenovo product, program, or service is not intended to state or imply that only that Lenovo product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any Lenovo intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any other product, program, or service. Lenovo may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to:

Lenovo (United States), Inc.
8001 Development Drive
Morrisville, NC 27560
U.S.A.
Attention: Lenovo Director of Licensing

LENOVO PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some jurisdictions do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. Lenovo may make improvements and/or changes in the product(s) and/or the program(s) described in this publication at any time without notice.

The products described in this document are not intended for use in implantation or other life support applications where malfunction may result in injury or death to persons. The information contained in this document does not affect or change Lenovo product specifications or warranties. Nothing in this document shall operate as an express or implied license or indemnity under the intellectual property rights of Lenovo or third parties. All information contained in this document was obtained in specific environments and is presented as an illustration. The result obtained in other operating environments may vary. Lenovo may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Any references in this publication to non-Lenovo Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this Lenovo product, and use of those Web sites is at your own risk. Any performance data contained herein was determined in a controlled environment. Therefore, the result obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurements may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

© Copyright Lenovo 2026. All rights reserved.

This document, LP1773, was created or updated on March 4, 2025.

Send us your comments in one of the following ways:

- Use the online Contact us review form found at:
<https://lenovopress.lenovo.com/LP1773>
- Send your comments in an e-mail to:
comments@lenovopress.com

This document is available online at <https://lenovopress.lenovo.com/LP1773>.

Trademarks

Lenovo and the Lenovo logo are trademarks or registered trademarks of Lenovo in the United States, other countries, or both. A current list of Lenovo trademarks is available on the Web at <https://www.lenovo.com/us/en/legal/copytrade/>.

The following terms are trademarks of Lenovo in the United States, other countries, or both:

Lenovo®

ServerProven®

ThinkAgile®

ThinkSystem®

The following terms are trademarks of other companies:

AMD is a trademark of Advanced Micro Devices, Inc.

Intel®, the Intel logo and Xeon® are trademarks of Intel Corporation or its subsidiaries.

Linux® is the trademark of Linus Torvalds in the U.S. and other countries.

Microsoft®, DirectX®, Windows Server®, and Windows® are trademarks of Microsoft Corporation in the United States, other countries, or both.

Other company, product, or service names may be trademarks or service marks of others.