ThinkSystem NVIDIA A40 48GB PCIe Gen4 Passive GPU

Product Guide

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.

Table 1. Ordering information

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

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 4)

Part Number	Description	2S AMD V3				2S Intel V3			4S 8S Intel V3			Multi Node			GPU Rich				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)	SR850 V3 (7D97 / 7D96)	SR860 V3 (7D94 / 7D93)	SR950 V3 (7DC5 / 7DC4)	SD535 V3 (7DD8 / 7DD1)	SD530 V3 (7DDA / 7DD3)	SD550 V3 (7DD9 / 7DD2)	SR670 V2 (7Z22 / 7Z23)	SR675 V3 (7D9Q / 7D9R)	SR680a V3 (7DHE)	SR685a V3 (7DHC)	ST250 V3 (7DCF / 7DCE)	SR250 V3 (7DCM / 7DCL)
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	8[1]	8	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	Y	Y	N	N	N	N

1. DisplayPort ports not supported and are disabled

Table 4. Server support (Part 2 of 4)

Part Number	Description	Edge					Super Computing					1S Intel V2			2S Intel V2		
		SE350 (7Z46 / 7D1X)	SE350 V2 (7DA9)	SE360 V2 (7DAM)	SE450 (7D8T)	SE455 V3 (7DBY)	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 (7Z71 / 7Z70)	SR650 V2 (7Z72 / 7Z73)
4X67A72593	ThinkSystem NVIDIA A40 48GB PCIe Gen4 Passive GPU w/o CEC	N	N	N	2[1]	N	N	N	N	N	N	N	N	N	N	N	3[2]
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. Double-wide GPUs are only supported in the SE450 with the 360mm chassis; not supported in the 300mm chassis

2. DisplayPort ports not supported and are disabled

Table 5. Server support (Part 3 of 4)

Part Number	Description	AMD V1					Dense V2				4S V2		8S	4S V1			1S Intel V1			
		SR635 (7Y98 / 7Y99)	SR655 (7Y00 / 7Z01)	SR655 Client OS	SR645 (7D2Y / 7D2X)	SR665 (7D2W / 7D2V)	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	2	N	N	3	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	N	N	N	N	N

Table 6. Server support (Part 4 of 4)

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

Operating systems	SE450	SR650 V3 (4th Gen Xeon)	SR650 V3 (5th Gen Xeon)	SR655 V3	SR665 V3	SR675 V3	SR650 V2	SR670 V2	SR655	SR665	SR670 (Xeon Gen 2)	SR670 (Xeon Gen 1)
Microsoft Windows 10	N	N	Y	Y	Y	N	N	N	Y [1]	N	N	N
Microsoft Windows 11	N	N	Y	Y	Y	N	N	N	Y	N	N	N
Microsoft Windows Server 2016	N	N	N	N	N	N	Y	Y	Y	Y	N	N
Microsoft Windows Server 2019	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	N	N
Microsoft Windows Server 2022	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 7.7	N	N	N	N	N	N	N	N	Y [2]	Y [2]	Y	Y
Red Hat Enterprise Linux 7.8	N	N	N	N	N	N	N	N	Y [2]	Y [2]	Y	Y
Red Hat Enterprise Linux 7.9	Y	N	N	N	N	N	Y	Y	Y [2]	Y [2]	Y	Y
Red Hat Enterprise Linux 8.0	N	N	N	N	N	N	N	N	Y [2]	N	Y	Y
Red Hat Enterprise Linux 8.1	N	N	N	N	N	N	N	N	Y [2]	Y [2]	Y	Y
Red Hat Enterprise Linux 8.2	N	N	N	N	N	N	Y	Y	Y [2]	Y [2]	Y	Y
Red Hat Enterprise Linux 8.3	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.4	Y	N	N	N	N	N	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.5	Y	N	N	N	N	N	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.6	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.7	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 8.8	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.0	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.1	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
Red Hat Enterprise Linux 9.2	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP1	N	N	N	N	N	N	N	N	Y [2]	Y [2]	Y	Y
SUSE Linux Enterprise Server 15 SP2	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP3	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP4	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
SUSE Linux Enterprise Server 15 SP5	Y	Y	Y	Y	Y	N	Y	Y	Y	Y	Y	Y
Ubuntu 18.04.5 LTS	N	N	N	N	N	N	Y	Y	N	N	N	N
Ubuntu 18.04.6 LTS	Y	N	N	N	N	N	N	N	N	N	N	N
Ubuntu 20.04 LTS	N	N	N	N	N	N	Y	N	N	N	N	N
Ubuntu 20.04.5 LTS	Y	N	N	Y	Y	Y	N	N	N	N	N	N
Ubuntu 22.04 LTS	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 6.5 U3	N	N	N	N	N	N	N	N	Y [2]	N	N	N
VMware vSphere Hypervisor (ESXi) 6.7 U3	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y

Operating systems	SE450	SR650 V3 (4th Gen Xeon)	SR650 V3 (5th Gen Xeon)	SR655 V3	SR665 V3	SR675 V3	SR650 V2	SR670 V2	SR655	SR665	SR670 (Xeon Gen 2)	SR670 (Xeon Gen 1)
VMware vSphere Hypervisor (ESXi) 7.0	N	N	N	N	N	N	N	N	Y [2]	Y [2]	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U1	N	N	N	N	N	N	N	N	Y [2]	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 7.0 U2	N	N	N	N	N	N	Y	Y	Y	Y	Y	Y
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	N	Y	Y	N	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0 U1	Y	Y	N	Y	Y	Y	Y	Y	Y	Y	Y	Y
VMware vSphere Hypervisor (ESXi) 8.0 U2	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

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

[2] The OS is not supported with EPYC 7003 processors.

NVIDIA GPU software

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

- NVIDIA vGPU Software (vApps, vPC, RTX vWS, and vCS)
- NVIDIA Omniverse Software (OVE)
- NVIDIA AI 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. Each Lenovo part number includes a fixed number of years of Support, Upgrade and Maintenance (SUMS).

- **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 8. NVIDIA vGPU Software

Part number	Feature code 7S02CTO1WW	Description
NVIDIA vApps		
7S020003WW	B1MP	NVIDIA vApps Perpetual License and SUMS 5Yr, 1 CCU
7S020004WW	B1MQ	NVIDIA vApps Subscription License 1 Year, 1 CCU
7S020005WW	B1MR	NVIDIA vApps Subscription License 3 Years, 1 CCU
7S02003DWW	S832	NVIDIA vApps Subscription License 4 Years, 1 CCU
7S02003EWW	S833	NVIDIA vApps Subscription License 5 Years, 1 CCU
NVIDIA vPC		
7S020009WW	B1MV	NVIDIA vPC Perpetual License and SUMS 5Yr, 1 CCU
7S02000AWW	B1MW	NVIDIA vPC Subscription License 1 Year, 1 CCU
7S02000BWW	B1MX	NVIDIA vPC Subscription License 3 Years, 1 CCU
7S02003FWW	S834	NVIDIA vPC Subscription License 4 Years, 1 CCU
7S02003GWW	S835	NVIDIA vPC Subscription License 5 Years, 1 CCU
NVIDIA RTX vWS		
7S02000FWW	B1N1	NVIDIA RTX vWS Perpetual License and SUMS 5Yr, 1 CCU
7S02000GWW	B1N2	NVIDIA RTX vWS Subscription License 1 Year, 1 CCU
7S02000HWW	B1N3	NVIDIA RTX vWS Subscription License 3 Years, 1 CCU
7S02000XWW	S6YJ	NVIDIA RTX vWS Subscription License 4 Years, 1 CCU
7S02000YWW	S6YK	NVIDIA RTX vWS Subscription License 5 Years, 1 CCU
7S02000LWW	B1N6	NVIDIA RTX vWS EDU Perpetual License and SUMS 5Yr, 1 CCU
7S02000MWW	B1N7	NVIDIA RTX vWS EDU Subscription License 1 Year, 1 CCU
7S02000NWW	B1N8	NVIDIA RTX vWS EDU Subscription License 3 Years, 1 CCU
7S02003BWW	S830	NVIDIA RTX vWS EDU Subscription License 4 Years, 1 CCU
7S02003CWW	S831	NVIDIA RTX vWS EDU Subscription License 5 Years, 1 CCU

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 A5000 or A6000 Ada GPUs for desktop environments.
- Data Center Solutions: Deployment with Lenovo OVX nodes or NVIDIA-Certified Servers equipped with L40, L40S or A40 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 9. NVIDIA Omniverse Software (OVE)

Part number	Feature 7S02CTO1WW	Description
7S02003ZWW	SCX0	NVIDIA Omniverse Enterprise Subscription per GPU, 1 Year
7S020042WW	SCX3	NVIDIA Omniverse Enterprise Subscription per GPU, 3 Years
7S020041WW	SCX2	NVIDIA Omniverse Enterprise Subscription per GPU, INC, 1 Year
7S020040WW	SCX1	NVIDIA Omniverse Enterprise Subscription per GPU, EDU, 1 Year
7S020043WW	SCX4	NVIDIA Omniverse Enterprise Subscription per GPU, EDU, 3 Years

NVIDIA AI Enterprise Software

Lenovo offers the NVIDIA AI Enterprise (NVAIE) cloud-native enterprise software. NVIDIA AI 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 AI Enterprise is licensed on a per-GPU basis. NVIDIA AI 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 AI Enterprise software indefinitely, with no expiration. NVIDIA AI 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 AI Enterprise software products with subscription includes support services for the duration of the software's subscription license

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

Table 10. Features of NVIDIA AI Enterprise Software (NVAIE)

Features	Supported in NVIDIA AI 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
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 11. NVIDIA AI Enterprise Software (NVAIE)

Part number	Feature code 7S02CTO1WW	Description
AI Enterprise Perpetual License		
7S02001BWW	S6YY	NVIDIA AI Enterprise Perpetual License and Support per GPU, 5 Years

Part number	Feature code 7S02CTO1WW	Description
7S02001EWW	S6Z1	NVIDIA AI Enterprise Perpetual License and Support per GPU, EDU, 5 Years
AI Enterprise Subscription License		
7S02001FWW	S6Z2	NVIDIA AI Enterprise Subscription License and Support per GPU, 1 Year
7S02001GWW	S6Z3	NVIDIA AI Enterprise Subscription License and Support per GPU, 3 Years
7S02001HWW	S6Z4	NVIDIA AI Enterprise Subscription License and Support per GPU, 5 Years
7S02001JWW	S6Z5	NVIDIA AI Enterprise Subscription License and Support per GPU, EDU, 1 Year
7S02001KWW	S6Z6	NVIDIA AI Enterprise Subscription License and Support per GPU, EDU, 3 Years
7S02001LWW	S6Z7	NVIDIA AI Enterprise Subscription License and Support per GPU, EDU, 5 Years

Find more information in the NVIDIA AI Enterprise Sizing Guide.

NVIDIA HPC Compiler Software

Table 12. 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		
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

Part number	Feature code 7S09CTO6WW	Description
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 13. Auxiliary power cables for A40 (click images to show larger versions)

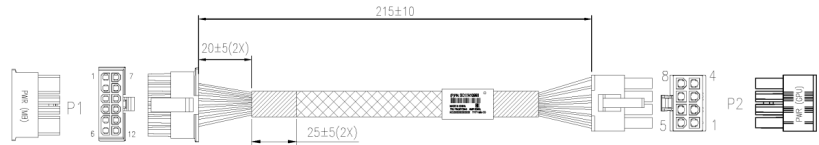| Auxiliary power cables needed with the SR665, SR650 V2, SR650 V3, SR655 V3, SR665 V3	
360mm 8pin (2x4) cable Option*: SR665: 4M17A80478 or 4M17A11759 SR650 V2: 4H47A38666 or 4H47A80491 SR650 V3: 4X67A82883 SR655 V3: 4X67A86438 SR665 V3: 4X67A85856 **Feature**: BAD8 **SBB**: SBB7A49792 or SBB7A21691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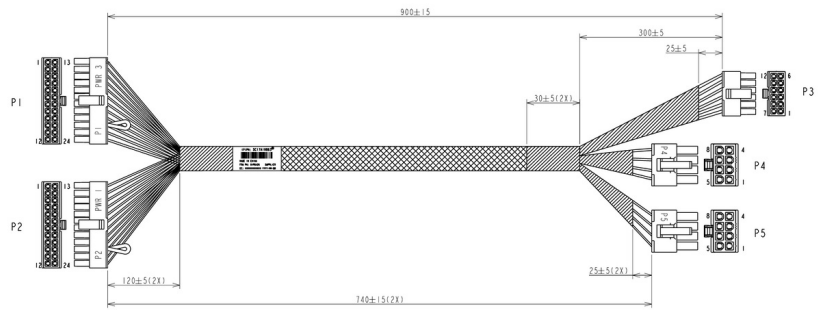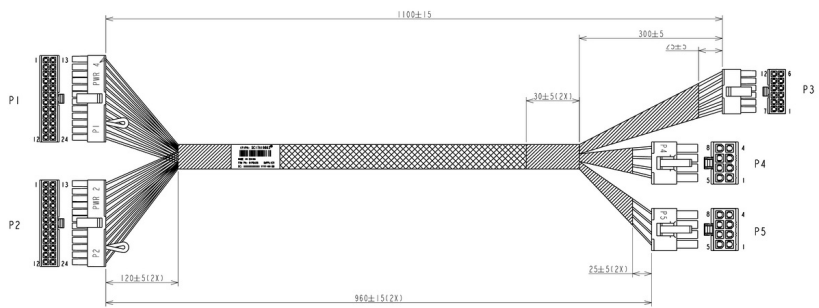
Regulatory approvals

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

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