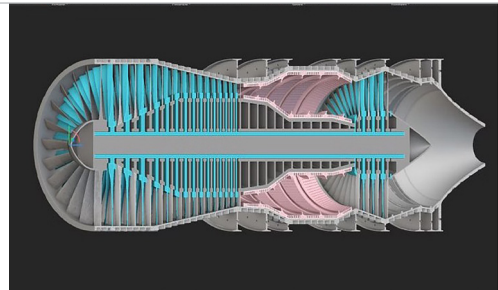
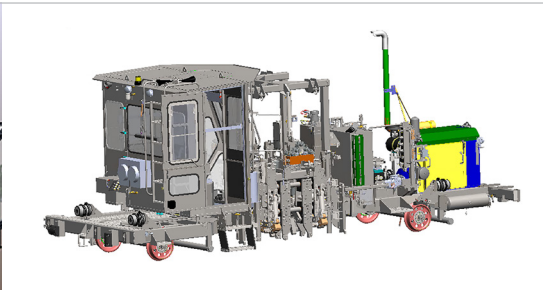
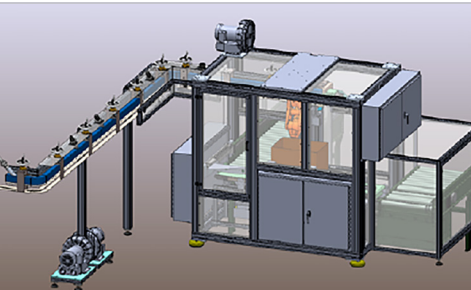


SPECIAL DIGITAL
ISSUE

GPU-ACCELERATED ENGINEERING



Advanced
PRODUCT DEVELOPMENT
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Welcome

Accelerated Engineering

The Advanced Product Development Resource Center (APDRC) is an ever-growing repository of information to help design engineering teams take advantage of new and innovative technologies that help them create better designs faster.



Access to GPU compute capabilities is revolutionizing the performance of simulation and design software, while also enabling new features and functions based on artificial intelligence (AI). Both NVIDIA and Dell Technologies are at the forefront of advancing GPU acceleration and AI in the engineering space.

In this Special Digital Issue from APDRC, we take a look at how new computing capabilities are optimizing engineering workflows, as well as how NVIDIA and Dell are driving this transformation.

You can learn more by visiting the resource center at APDRC.com for the latest developments on technological advances, videos, white papers and more from *Digital Engineering*, Dell and NVIDIA. We hope you enjoy the digital issue.

Brian Albright

Editorial Director, *Digital Engineering*, Peerless Media, LLC

Comments? E-mail me at: balbright@digitaleng.news

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NVIDIA Showcases AI Capabilities at PTC Global Summit

NVIDIA RTX GPUs and Dell Technologies AI-ready workstations help enable advanced design and engineering workflows.

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Delivering Precision and Innovation to Custom Engineered Solutions

Automated Motion, Inc. reduced costly trial and error testing by 50% with SOLIDWORKS® flow and pressure simulation on their new Dell Precision 7670 mobile workstation.

Image courtesy of Dell Technologies

Eliminating Engineering Bottlenecks With an **Advanced Workstation and GPU**

Automated Motion Inc. reduced physical testing by 50% with SOLIDWORKS simulation, Dell Precision workstations and NVIDIA RTX™ GPUs.

As designs and models become more complex and compute-intensive, the need for modern engineering workstations is more apparent. At Automated Motion Inc., which designs and builds test equipment and specialized fixtures for aerospace, military, and custom manufacturing applications, computing latency related to managing large models and multi-page drawings were beginning to affect project turnaround times.

In a new case study published by Dell Technologies, you can learn how AMI leveraged a new mobile workstation and NVIDIA RTX GPU technology to reduce the time required to create large models; accelerated manipulations of large assemblies and complex drawings; enabled more advanced simulation; and improved performance for engineering users.

Missouri-based [AMI](#) has been in business for more than 30 years, offering full-service design engineering, contract manufacturing, and custom product solutions.

AMI runs SOLIDWORKS on a new [Dell Precision 7670](#) 16-in. mobile workstation with [NVIDIA RTX A4500 GPU](#) and Intel Core i9-12950HX processor. With the new workstation,

around converting files and regenerating detailed assemblies, which affected work quality, and the types of projects AMI could accept. According to the case study, the ability to conduct complex simulations has also cut the need for costly physical testing by half.

With the NVIDIA RTX A4500 graphics processing power, AMI can render larger, intricate designs faster and more accurately. The GPU also allows engineering to perform complex simulations that were nearly impossible before, including computational fluid dynamics, thermal analysis, and structural integrity.

“The new Dell/NVIDIA workstation is amazing as it enables us to do simulations not possible

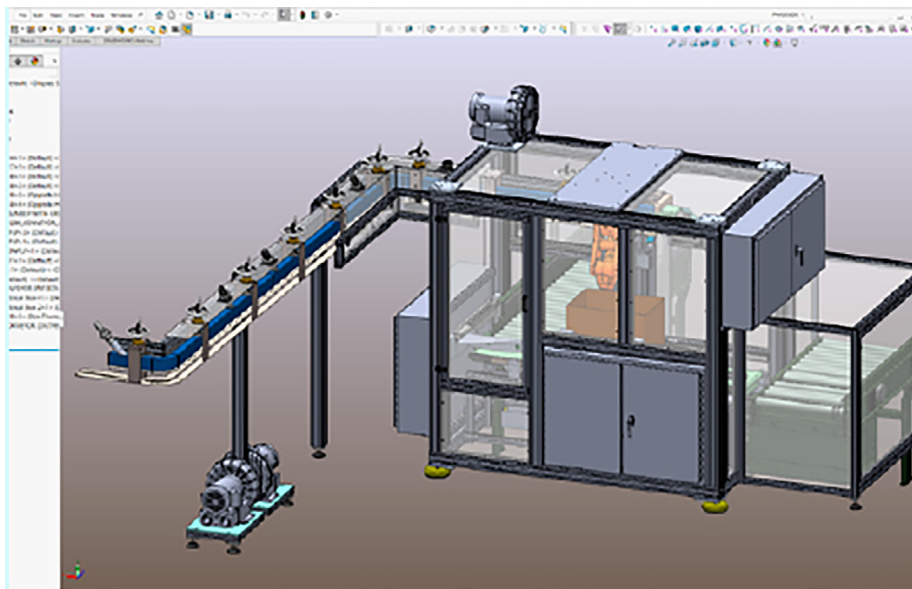


Image courtesy of Dell Technologies.

the company has improved its ability to manage large, complex projects. According to the case study, thanks to the upgraded hardware and advanced graphics processing, loading and manipulating these demanding files in SOLIDWORKS is at least twice as fast.

The Dell Precision 7670 offers a 4K display, support for Wi-Fi and 5G LTE wireless connectivity, is ISV-certified for leading engineering applications, and offers flexible memory options (supporting up to 128GB of RAM). The NVIDIA RTX A4500 features 20GB of GPU memory and offers hardware-accelerated ray tracing.

The new workstation also removed bottlenecks

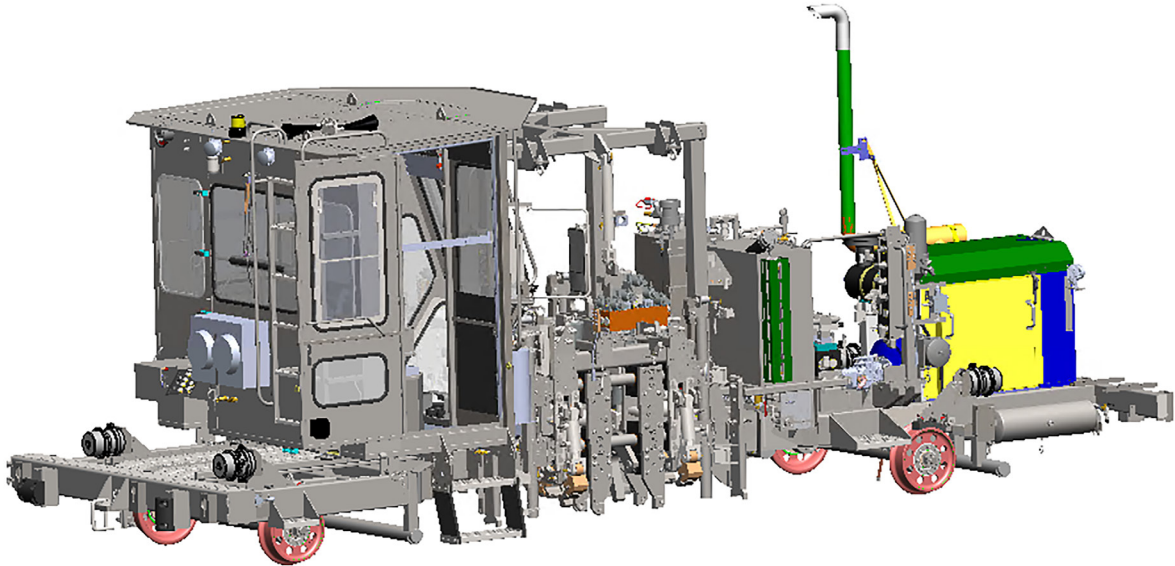
before,” said Mike Hutchings, Senior Mechanical Engineer at AMI. “This helps us evaluate design options and improve the final product.”

According to the case study:

“The ability to handle larger data sets and complex calculations means that AMI can now take on projects with higher levels of complexity. This capability not only enhances the quality of the designs but also improves the overall efficiency of the design process. Clients benefit from faster turnaround times and higher-quality outputs, as AMI can now iterate more quickly and make more informed decisions during the design phase.”

You can read the entire case study [here](#).

Configuring a Workstation for **SOLIDWORKS 2025**



Images courtesy of Bryan Pawlak/GoEngineer.

Learn how to select the right hardware
for the latest release of SOLIDWORKS.

Dassault Systèmes has released SOLIDWORKS 2025, once again announcing a host of new improvements and updates, including enhanced collaboration and data management; streamlined workflows for parts, assemblies, drawings; 3D dimensioning and tolerancing; ECAD/MCAD collaboration; and rendering. The new release also includes updates to SOLIDWORKS PDM, SOLIDWORKS Simulation, SOLIDWORKS Electric Schematic, SOLIDWORKS Electrical Schematic Designer, and DraftSight applications that enable better and faster design.

As we have previously written in the APDRC, SOLIDWORKS performance can be improved and optimized by using a correctly configured, professional engineering workstation, like those in the [Dell Pro Max workstation line](#), equipped with NVIDIA professional RTX GPUs. We spoke to Bryan Pawlak, Senior Application Engineer, Strategic Solutions, at GoEngineer, to discuss hardware configuration recommendations for the latest version of SOLIDWORKS.

What GPUs would you recommend for typical SOLIDWORKS 2025 workflows?

I will typically recommend the NVIDIA RTX 2000 Ada Generation GPUs for most users. This card has performed extremely well in benchmarks. As assembly models get much larger, say 7,000 to 10,000 [elements], then we start discussing the NVIDIA 4000Ada Generations GPUs. The 4000-level GPU does increase a system's cost but can obviously handle larger models and assemblies with ease.



Image Courtesy of Koenigsegg

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What do you typically recommend for SOLIDWORKS users when it comes to CPUs?

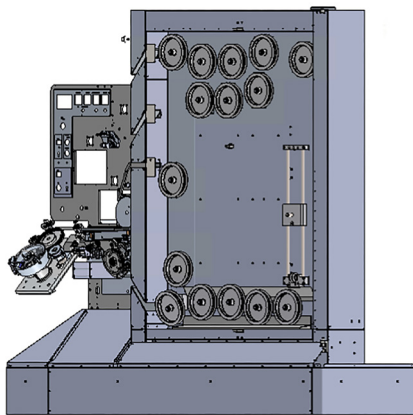
SOLIDWORKS mainly operates as a single-threaded application, utilizing just one core of the processor most of the time. Therefore, the overall performance is significantly influenced by the processor's clock speed. I usually focus on the boost speed of the processor, as it represents the highest speed the processor can achieve.

What workflows are best suited to those higher core count CPUs?

SOLIDWORKS Simulation is one of the primary areas the software can take advantage of multiple threads. This amount will vary depending on which solver is used.

How much RAM do users need?

I recommend that most everyday users have 32GB RAM, and if users work on extremely large assemblies or very large or complex imported geometries, users should have 64GB RAM. Using the task manager, users can monitor the system ram usage as they work to see if their models are pushing the 32 GB limit.



What are your recommendations for storage?

All hard drives should be solid-state drives for SOLIDWORKS. I highly recommend using a data management tool whenever a user is storing data on a server since one of the primary functions is to cache a copy locally while working on the file(s), but it will store the files on the server when checked back in.

What are the best options for working with large assemblies remotely/from home?

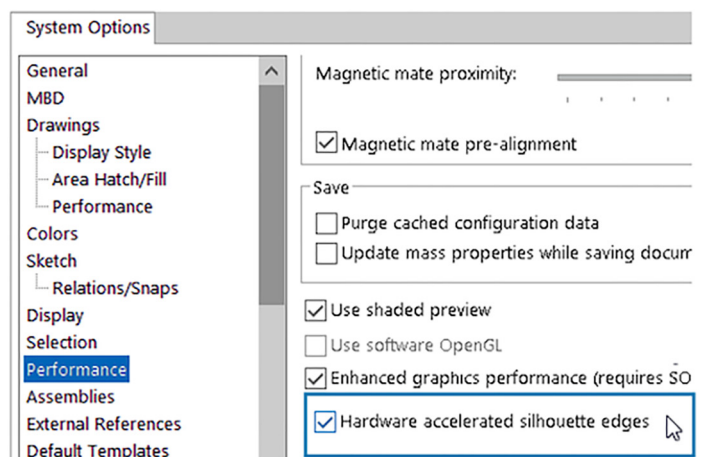
Working from home still provides many challenges. VPN and Internet bandwidth are limiting factors when dealing with large datasets. PDM standard and PDM professional both offer work offline modes to prevent the need for constant communication with the server. Checking out large datasets before leaving the office will cache the files locally, eliminating the need to transfer data across a VPN connection.

The 3DEXperience is a cloud-based storage tool that will use your internet connection instead of a VPN connection. Connection speeds are dependent on each user's internet provider, but can provide improved downloads over a VPN.

Are there any new features related to large assemblies that may influence hardware selection?

The newest enhancement that specifically affects hardware would be the addition of Hardware Accelerated Silhouette Edges. This enables the GPUs to improve the display of silhouette edges in HLR, HLV, and wireframe view modes.

In Tools > Options > System Options > Performance, select Hardware accelerated silhouette edges.



What are some other tweaks or changes to SOLIDWORKS settings in the latest release that can improve performance?

Image quality has a big impact on overall performance, and the performance evaluation report is a tool that breaks down assembly performance to help users understand what components are impacting performance.

New to the report is the total graphic triangle count at the top level of the assembly. This allows us to see how many graphic triangles the system is computing.

Total number of triangles in the assembly, under Graphics Triangles Details, displays the total number of graphic triangles in the top-level assembly.

Reduce Image Quality, under Shaded Image Quality, reduces the shaded image quality to 50% for the parts with higher image quality. This option does not apply to subassemblies.


Graphics Triangles Details
Total triangles in the assembly: 4,378,272


This option is not available for assemblies opened in lightweight mode except when the assembly has a flexible subassembly. Clicking Reduce Image Quality moves the Low (faster) - High (slower) slider closer to the Low (faster) side.


To view the slider, click Tools > Options > Document Properties > Image Quality. The slider is under Shaded and draft quality HLR/HLV resolution.


Is there anything else you would like to add?

Upgrading hardware is important and can add a boost to overall performance, but it does not make up for poor modeling practices. When you optimize your modeling practices and combine this with the latest hardware, this is when you will see the biggest performance gains.

Under Shaded Image Quality in the Display Performance section, click **Reduce Image Quality** .

 **Shaded Image Quality**
8 parts have a medium high image quality set in the Document Properties.

 [Show These Files](#)

 [Reduce Image Quality](#)

To learn more about how Dell professional workstations and NVIDIA professional RTX GPUs can improve SOLIDWORKS performance, visit the Dell booth (#602) at 3DEXPERIENCE World in Houston, Feb. 23 - 26.

Dell and NVIDIA are also presenting a session on Tuesday, Feb. 25, [“AI at the Edge: The Role of Local Compute for Product Design & Manufacturing.”](#)

You can learn more about Dell Pro Max workstations [here](#).

GoEngineer’s Bryan Pawlak will also be on hand, presenting [“Achieving Extreme Performance: Making Informed Decisions About Hardware,”](#) that will include a deeper dive into his configuration recommendations, and benchmarking studies.

NVIDIA, nTop Strengthen 3D Solid Modeling Collaboration

NVIDIA invests in nTop, integrates OptiX rendering into nTop software.

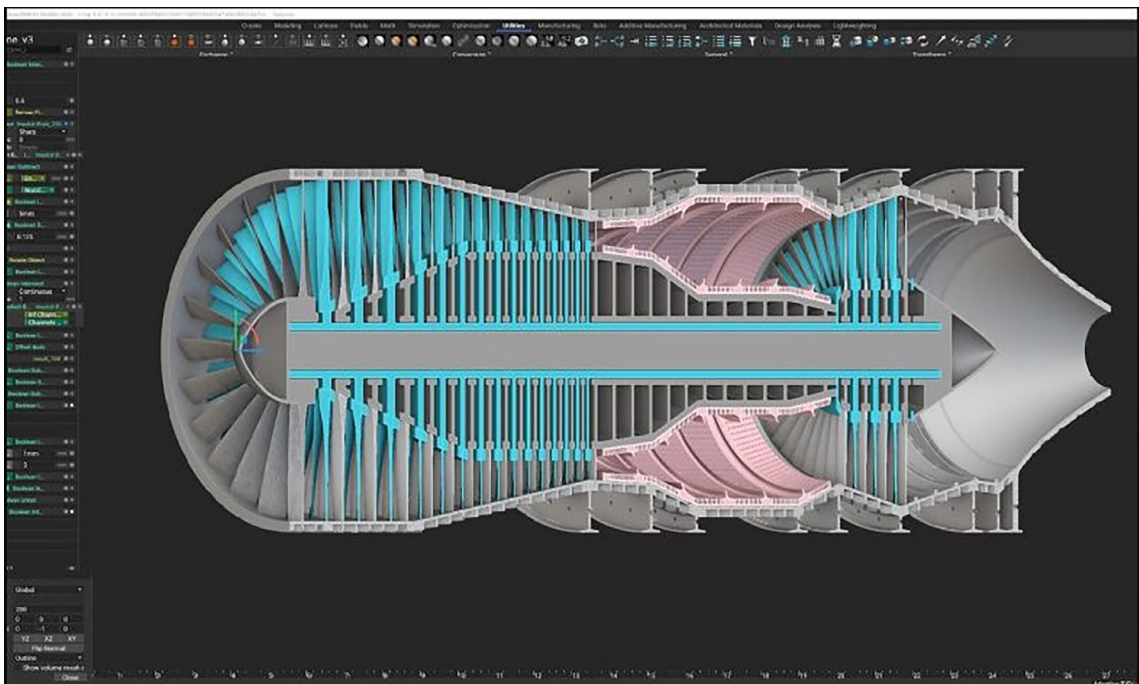


Image courtesy of nTop.

In 2024, NVIDIA announced that it was investing in computational design software provider nTop via its NVentures venture capital subsidiary, as well as collaborating with the company to integrate their software offerings – building on their ongoing partnership around nTop’s platform being optimized to run on NVIDIA RTX™ GPUs, and nTop’s participation in the NVIDIA Inception program.

According to the company, nTop’s software automates design and optimization processes while integrating with engineering teams’ existing design, analysis, and simulation tools and workflows. nTop’s integration with NVIDIA RTX professional GPUs allows engineering teams to accelerate product design and

engineering workflows.

As part of the new agreement, nTop’s software will be integrated with the NVIDIA OptiX™ rendering framework and NVIDIA Omniverse™ platform, enabling developers to create new features that help engineering teams accelerate and better visualize designs.

NVIDIA Omniverse is a platform of APIs, SDKs, and services that enable developers to integrate Universal Scene Description (OpenUSD) and NVIDIA RTX™ rendering technologies into existing software tools and simulation workflows for building AI systems.

According to the announcement:

“The first proof of concept integrates the NVIDIA OptiX ray-tracing framework to provide more realistic rendering in nTop. Omniverse SDKs and APIs will also be used to integrate nTop implicits into the Omniverse and [OpenUSD](#) ecosystem to provide engineering teams an immersive 3D collaboration environment to see and interact with live [digital twins](#) of their parts and assemblies. As changes are made to designs in nTop, they can be reflected in OpenUSD applications developed on the Omniverse platform, with no meshing necessary for the transfer.”

nTop is a member of [NVIDIA Inception](#), a program that nurtures startup companies revolutionizing industries with technological advancements. According to Les Karpas, Inception Partner Manager at NVIDIA, the program has 22,000 members globally. Members benefit from discounts on hardware, as well as credits for accessing cloud compute resources. Members also have access to the [NVIDIA Deep Learning Institute](#), the NVIDIA internal training library, and matchmaking portal to connect with venture capital partners.

But the relationship between nTop and NVIDIA stretches back to the early days of the company, says Bradley Rothenberg, co-founder and CEO, nTop. Originally, nTop leveraged parallel processing on CPUs for modeling complex shapes. In 2017, though, the nTop team compiled its core modeling technology on NVIDIA GPUs. “It was this magic moment, because I could take a model like a really complex heat exchanger, and real time I could make edits to the design and see those updates on my

screen,” Rothenberg says. “There is a symbiotic relationship between nTop and NVIDIA where the advancements they achieve in GPU and parallel compute have enabled advancements in our 3D solid modeling technology.”

nTop will also be developing a proof of concept through its integration with NVIDIA Omniverse that allows its core models to exist within applications built by developers on the Omniverse platform. When nTop users make changes to a model, it will automatically update the model in a USD-based application built on Omniverse and vice versa. “nTop was one of the first [third-party] Omniverse Connectors,” Karpas says. “If you are doing iterative simulation, nTop can make generative design changes based on the simulation results. It is a very powerful tool.”

NVIDIA has also collaborated with nTop on the use of signed distance fields (SDF) for fast and robust modeling of parts and systems. “If you are doing Boolean Operations in CAD, and taking one geometric solid body and subtracting or adding it to another, it’s important to have these be fully closed, manifold objects,” Karpas says. “This creates a lot of headaches for CAD users when in, in the course of regular modeling, you pierce a mesh and something is not solid. You can waste a lot of time in 3D modeling to enclose those objects. Using a field-based approach, you treat the body not as a solid but more as a cloud of points, and this makes it much easier to subtract and manipulate those bodies. It is also very computationally friendly to GPUs.”

SDFs are being incorporated into the [OpenUSD](#) platform.

“OptiX is really the first proof of concept of integrating NVIDIA technology into nTop,” Rothenberg says. “You can render in real time with high-quality materials in nTop, and do so quickly when you are modeling complex parts.”

To learn more about nTop, visit: www.ntop.com.

Dell Rugged Laptops Get **NVIDIA RTX™** **GPU Boost**



The new Dell Pro Rugged 14 semi-rugged laptop supports the NVIDIA RTX™ 500 Ada Generation Laptop GPU for advanced graphics and AI performance.

As more engineers in the manufacturing and construction space leave their desks and take their work to challenging job sites, they have identified the need for a more robust computing solution than a standard-issue laptop. But rugged laptops built for these harsh environments are usually equipped with less powerful CPUs and in many cases, either don't have a discrete GPU or rely on consumer-grade cards.

That's changing, though, thanks to Dell Technologies' line of semi-rugged laptops that support NVIDIA's AI platform and GPUs. In October, 2024, the company announced the Dell Pro Rugged 14, which boasts support for the NVIDIA RTX 500 Ada Generation Laptop GPU as well as 14th-gen Intel CPUs.

Dell previously offered support for the NVIDIA T500 Laptop GPU in its rugged Latitude 5430. With RTX 500 support, the new Dell Pro Rugged 14 (a rebrand from the Latitude labeling) offers a GPU with AI acceleration and ray tracing support,

more cores, and faster processing speeds.

The RTX 500, announced earlier this year, was designed with artificial intelligence and hybrid work environments in mind. According to [NVIDIA](#), the NVIDIA RTX GPU provides up to 10x the graphics performance for 3D rendering compared to a CPU-only configuration. The RTX 500 also offers up to 2x the ray tracing performance and 2x the throughput of previous-gen GPUs. It also comes equipped with 4GB of GPU memory. The NVIDIA RTX 500 Ada laptop GPU also

provides dedicated AI processing Tensor cores that can accelerate the local processing of rapidly emerging AI features in professional software applications.

While Dell does offer a fully-rugged device with the [Dell Pro Rugged 13](#), it does not support a discrete GPU. According to David Plourde, Strategic Alliances, Rugged Portfolio at Dell Technologies, the rebranded rugged line will be refreshed on a two-year cycle moving forward.

“I believe the demand for better graphics is driven by the architecture, engineering, and construction market’s need for enhanced functionality,” Plourde says. “A site manager might need to access drawings or schematics on the go. Similarly, on a shop floor, an engineer may need to transition from a desktop role to a manufacturing environment with harsh conditions. Engineers require tools and applications that demand more power than a standard rugged PC.”

In addition to the upgraded CPU and GPU, the device (which is part of the AI PC line at Dell) also sports an NPU, faster memory, and a removable hard drive. There

are also dual hot-swappable batteries to support all day field use, and support for wireless 5G communications and GPS.

The computer also has a very bright, glove touch enabled 1100-nit screen which is ideal for outdoor use under any condition. To meet the MIL-STD-810H testing criteria, it is drop-tested from 3-feet 26 times, operational temperature tested from -20°F to 145°F, and has an ingress protection rating of IP-53.

The Dell Pro Rugged 14 also benefits from Dell support services. “One of the biggest advantages of our rugged products versus our competitors’ products, is that we offer the same level of service to our customers that they are accustomed to with any of our client devices,” Plourde says. “We can come on site and provide next-business-day service while other companies make you ship the computer in for service. We also offer the same management tools our customers have become accustomed to when managing their other Dell client systems.”

You can learn more about the Dell Pro Rugged 14 [here](#).



The Dell Pro Rugged 14 with NVIDIA RTX™ 500 Ada Generation Laptop GPU support. All images courtesy of Dell.

NVIDIA CEO Jensen Huang delivers the keynote for GTC 2025 at the SAP Center in San Jose, California. Image courtesy of NVIDIA.



NVIDIA GTC 2025: New Blackwell Ultra in the Horizon

CAE software developers reveal plans to accelerate software using new NVIDIA CUDA-X and Blackwell

At [NVIDIA](#) GTC in San Jose, CA, in the spring of 2025, the keynote took place at the SAP Center, a sports and concert venue that seats 17,000. It was a 14-minute drive from the Denny's on Berryessa Road where the idea for the graphics company that would become NVIDIA was first hatched. In 24 years since its launch, the company has evolved from a graphics hardware maker into an AI powerhouse. This year, in his keynote, NVIDIA CEO Jensen Huang highlighted the rise of Agentic AI.

“It all started with computer vision, or perception AI, then generative AI. For the last five years we focused primarily on generative AI ... generative AI fundamentally changed how computing is done, from a retrieval computing model to a generative model. In the past, it was about creating something in advance to retrieve it on demand. Now, AI understands the context, the request, and if necessary, it gets the information and generates what it knows.”

But Huang believes the industry is ready to move to the next two phases: Agentic AI, and physical AI. “The ability to understand its surroundings is going to lead to a new era—what we call physical AI, and it’s going to enable robotics. Each of these waves opens up new opportunities for us,” he said. There is strong evidence of the future Huang envisioned on the show floor, in the form of semi- or fully autonomous robots roaming the venue.

Closing out the keynote, Huang appeared alongside Blue, a small robot, to announce, “Groot N1 is now open source.” NVIDIA Isaac Groot N1 is the company’s foundation model for humanoid robots. The outcome of a collaboration among NVIDIA, Google DeepMind, and Disney Research, the model is described as “fully customizable foundation model for generalized humanoid reasoning and skills.”

NVIDIA Blackwell Ultra on the Horizon

During his keynote, Huang revealed Blackwell GPUs are in full production. The NVIDIA RTX PRO™ GPUs under the Blackwell architecture are designed for professional users. Huang also teased the audience with the next lineup in the roadmap: NVIDIA Blackwell Ultra GPUs.

“Blackwell Ultra includes the NVIDIA

GB300 NVL72 rack-scale solution and the NVIDIA HGX B300 NVL16 system. The GB300 NVL72 delivers 1.5x more AI performance than the NVIDIA GB200 NVL72, as well as increases Blackwell’s revenue opportunity by 50x for AI factories, compared with those built with NVIDIA Hopper,” said NVIDIA.

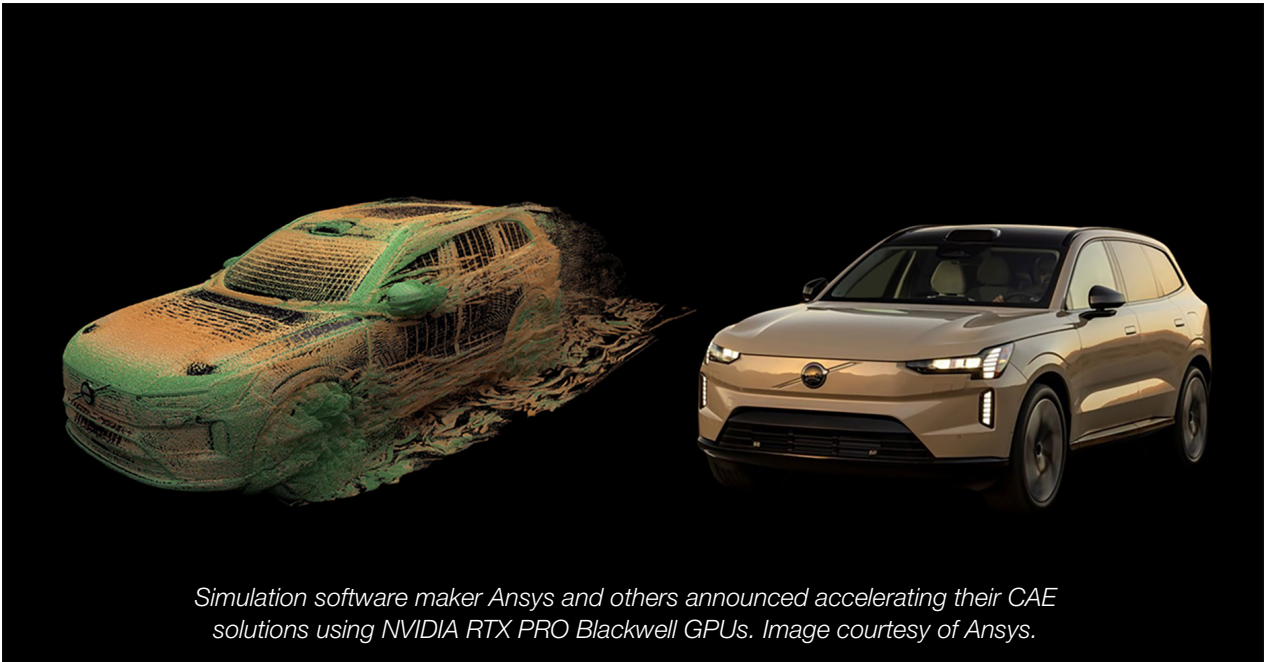
The company suggested NVIDIA Blackwell Ultra GPUs are ideal for Agentic AI and Physical AI, because they feature “sophisticated reasoning and iterative planning to autonomously solve complex, multistep problems. AI agent systems go beyond instruction-following. They can reason, plan and take actions to achieve specific goals,” and they enable “companies to generate synthetic, photorealistic videos in real time for the training of applications such as robots and autonomous vehicles at scale.”

The RTX PRO 6000 GPUs, meant for professional users, “will double the memory, from 48GB to 96GB,” said Himanshu Iyer, Manufacturing Industry Manager, NVIDIA. The desktop and laptop version of Blackwell GPUs have their own built-in cooling mechanisms, whereas the HPC- and server-targeted Blackwell 6000 will be “passively cooled,” said Iyer.

Blackwell Accelerates CAE Ecosystem by up to 50X

During the show, NVIDIA announced that [18 leading CAE software vendors](#), including Ansys, Altair, Cadence, Siemens and Synopsys, are adding GPU-based acceleration using NVIDIA’s Blackwell products.

Anirudh Devgan, president and CEO of Cadence, said, “NVIDIA Blackwell’s



acceleration of the Cadence.AI portfolio delivers increased productivity and quality of results for intelligent system design — reducing engineering tasks that took hours to minutes and unlocking simulations not possible before. Our collaboration with NVIDIA drives innovation across semiconductors, data centers, physical AI and sciences.”

For demonstration, Cadence used NVIDIA Grace Blackwell-accelerated systems to simulate an entire aircraft’s takeoff and landing operations. “Using the Cadence Fidelity CFD solver, Cadence successfully ran multibillion-cell simulations on a single NVIDIA GB200 NVL72 server in under 24 hours, which would have previously required a CPU cluster with hundreds of thousands of cores and several days to complete,” NVIDIA pointed out.

Ajei Gopal, president and CEO of Ansys, said, “By harnessing the computational performance of NVIDIA Blackwell GPUs, we at Ansys are

empowering engineers at Volvo Cars to tackle the most complex computational fluid dynamics challenges with exceptional speed and accuracy, enabling more optimization studies and delivering more performant vehicles.”

The two companies collaborated with carmaker Volvo to accelerate fluid flow simulation. According to the announcement, they were able to “reduced external aerodynamic simulation run times from 24 hours to 6.5, using just eight NVIDIA Blackwell GPUs.”

On-demand CAE infrastructure provider Rescale also launched CAE Hub, designed to let users acquire and use NVIDIA GPU-accelerated CAE packages. According to NVIDIA, “Boom Supersonic, the company building the world’s fastest airliner, will use the NVIDIA Omniverse Blueprint for real-time digital twins and Blackwell-accelerated CFD solvers on Rescale CAE Hub to design and optimize its new supersonic passenger jet.”

Cadence Partnership

Cadence showcased ground-breaking acceleration and AI-driven engineering design and science with Grace Blackwell. The company is using NVIDIA Grace Blackwell-accelerated systems to enable the simulation of an entire aircraft during takeoff and landing. According to the company: “Using the Cadence Fidelity CFD solver, Cadence successfully ran multibillion cell simulations on a single NVIDIA GB200 NVL72 server in under 24 hours, which would have previously required a CPU cluster with hundreds of thousands of cores and several days to complete.”

“Cadence is accelerating AI-driven EDA and system design and analysis workloads on NVIDIA’s latest Grace Blackwell NVL72 platform. We’re enabling the delivery of today’s infrastructure AI and agentic AI and transforming the principled simulations that underpin physical AI and sciences AI,” said Dr. Anirudh Devgan, president and CEO of Cadence. “With these breakthroughs, we’re now able to perform massive simulations of complex systems that weren’t possible before in hours, including some of the largest and most accurate simulations of full aircraft to date.”

Ansys Partnership

During the conference, simulation software maker Ansys and NVIDIA announced plans to advance Physical AI and robotics as the next generation of AI technology. Ansys wrote, “PyAnsys is a collection of open-source Python libraries that bridge Ansys tools and the Python scripting language, making it easier to run simulations, modify geometries, and process results automatically. NVIDIA NIM—a set of inference microservices for developers to easily deploy AI models—enables Ansys users to connect with large

language models (LLMs), in this case via a chatbot.”

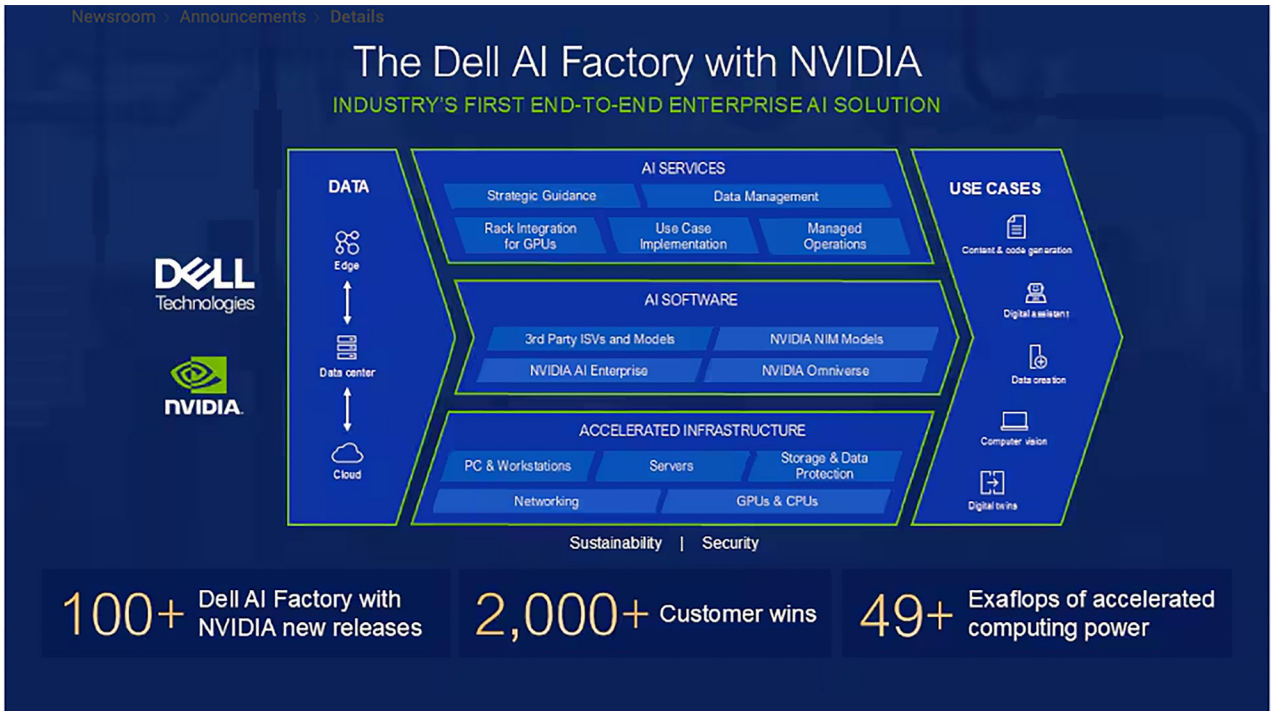
At the show, Ansys demonstrated the framework to offer tailor-made treatments and outcome predictions for those with cardiovascular disease. From within the PyAnsys-Heart library, a clinician can ask the chatbot, “What does my patient’s heart look like?” PyAnsys-Heart is expected to generate the code for the patient’s heart, enabling a partial or full anatomical simulation model in LS-DYNA and a full visualization in Omniverse-powered application.

Luminary Cloud and nTop

At the show, Luminary Cloud and nTop announced a new integration with NVIDIA PhysicsNeMo to reduce physics-based AI design optimization. The companies stated the new method reduces processing time from weeks or months to mere hours. “By seamlessly connecting nTop’s parametric geometry generation, Luminary’s GPU-native simulation, and simulation management platform, and NVIDIA’s PhysicsNeMo via APIs, engineers can now create and analyze hundreds of design variations in a single day—a process that previously took weeks to months of manual effort across disconnected systems,” said Luminary Cloud.

“The use of cloud-native platforms and modern APIs from nTop and Luminary enable the generation of ensembles of simulations and vast amounts of data that are easy to curate, store, and consume for physics AI model training in less than a day,” said Juan J. Alonso, CTO and cofounder of Luminary Cloud. “Without the ability to seamlessly manage the data we rely on, even the most sophisticated companies today are unable to deploy Physics AI models as quickly as required.”

You can explore NVIDIA GTC conference sessions and keynotes [here](#).



At NVIDIA GTC, Dell Technologies announced new AI products and advancements. Image courtesy of NVIDIA.

Dell, NVIDIA Put AI Supercomputers on the Desktop

At NVIDIA GTC, Dell Technologies unveiled new AI PCs, servers and capabilities to advance the use of artificial intelligence in demanding workflows.

At the NVIDIA GTC event in San Jose in March 2025, Dell Technologies announced new AI PCs, infrastructure, software and services that the company said will advance the adoption of artificial intelligence (AI) in the enterprise.

“Dell is going to be offering a whole line of NVIDIA enterprise IT AI infrastructure systems and all the software that runs on top of it. So you can see that we’re in the process of revolutionizing the world’s enterprise,” said Jensen Huang, CEO of NVIDIA during his keynote address at GTC.

At the event, Dell unveiled plans to support the new NVIDIA DGX personal AI supercomputer platforms, built on the NVIDIA Grace Blackwell platform – DGX Spark and DGX Station. DGX Spark was formerly called Project DIGITS and is meant to be a small form-factor personal supercomputer for AI workloads. DGX Station is a new high-performance desktop supercomputer, to be powered by the upcoming Blackwell Ultra GPUs.

“DGX Stations are powered by ARM-based CPUs and the upcoming Blackwell Ultra GPUs, with a combined memory of 784GB. So it can accelerate both your CPU-based workflows as well as the GPU-based ones,” said Himanshu Iyer, Manufacturing Industry Manager at NVIDIA. “That will enable creators, developers, and engineers to work with much larger AI models locally.”

Since DGX Stations run on NVIDIA GB300 superchip, the chip that combines the Grace CPU and Blackwell Ultra GPU, they also accelerate

processing by reducing the data transfer between CPU and GPU through interconnects.

Dell Technologies was among the first NVIDIA hardware partners to announce upcoming DGX products in its [Pro Max line](#), and will also offer server products that support the NVIDIA Blackwell Ultra platform, featuring up to 288GB of HBM3e memory, known for advanced high bandwidth, and optimized for workloads like Large Language Model (LMM) training.

NVIDIA DGX Advance AI Compute Capabilities

According to NVIDIA, DGX Spark is the world’s smallest AI supercomputer, built on the NVIDIA GB10 Grace Blackwell Superchip and optimized for the desktop form factor. GB10 features an NVIDIA Blackwell GPU with fifth-generation Tensor Cores and FP4 support, delivering up to 1,000 trillion operations per



DGX Spark and DGX Station bring the power of the Grace Blackwell architecture from the data center to the desktop. Image courtesy of NVIDIA.

second of AI compute for “fine-tuning and inference with the latest AI reasoning models, including the NVIDIA Cosmos Reason world foundation model and NVIDIA GR00T N1 robot foundation model,” according to NVIDIA.

NVIDIA DGX Station desktop systems will be built with the NVIDIA GB300 Grace Blackwell Ultra Desktop Superchip, and feature 784GB of coherent memory space to accelerate large-scale training and inferencing workloads. The GB300 Desktop Superchip features an NVIDIA Blackwell Ultra GPU with latest-generation Tensor Cores and FP4 precision, connected to a high-performance NVIDIA Grace CPU via NVLink-C2C.

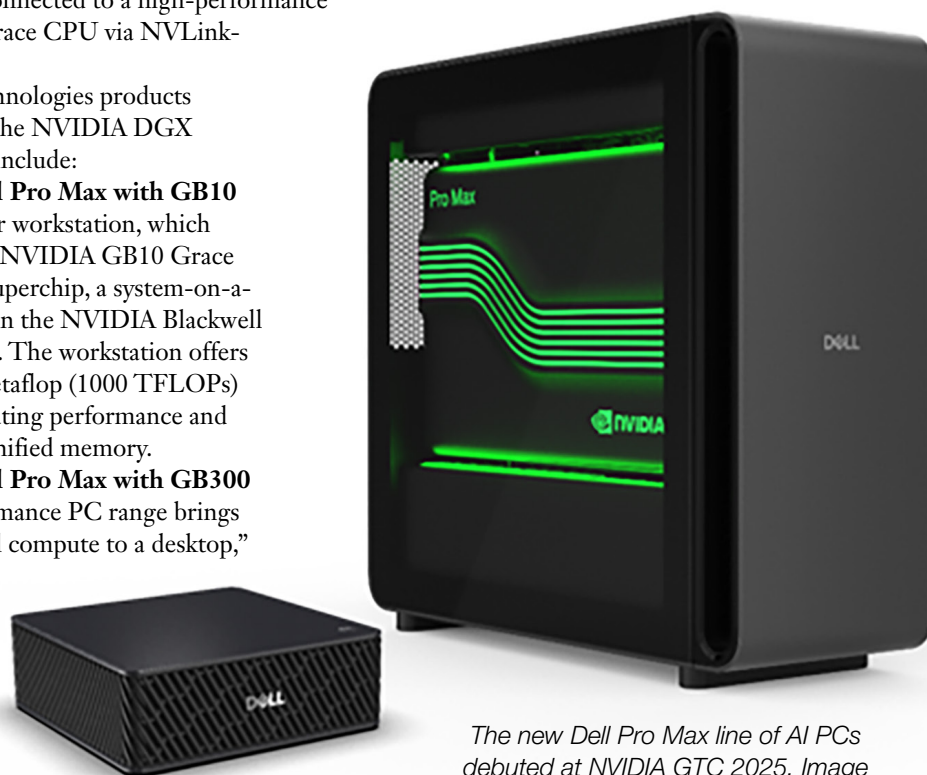
Dell Technologies products supporting the NVIDIA DGX technology include:

The **Dell Pro Max with GB10** AI developer workstation, which features the NVIDIA GB10 Grace Blackwell Superchip, a system-on-a-chip based on the NVIDIA Blackwell architecture. The workstation offers up to one petaflop (1000 TFLOPs) of AI computing performance and 128GB of unified memory.

The **Dell Pro Max with GB300** high-performance PC range brings “server-level compute to a desktop,”

the company says. Featuring the new NVIDIA GB300 Grace Blackwell Ultra Desktop Superchip, it provides up to 20 petaflops of AI computing performance, 784GB unified system memory (up to 288GB HBME3e GPU memory and 496GB of LPDDR5X CPU memory) and fast networking with NVIDIA ConnectX-8 SuperNIC.

The new Dell Pro Max notebooks and desktops are equipped with NVIDIA RTX PRO Blackwell Generation GPUs and Intel Core Ultra (Series 2).



The new Dell Pro Max line of AI PCs debuted at NVIDIA GTC 2025. Image courtesy of Dell Technologies.

Dell also showcased new PowerEdge servers. The **Dell PowerEdge XE8712** is described as its “most advanced research data center server innovations yet.” The system can host up to 144 NVIDIA Blackwell GPUs, with direct liquid cooling.

Dell PowerEdge XE7740 and **XE7745** servers will be available with the Dell AI Factory with NVIDIA. The servers are currently available with up to eight NVIDIA H200 NVL GPUs and a five-year subscription to NVIDIA AI Enterprise software. They also support up to eight NVIDIA RTX PRO 6000 Blackwell Server Edition PCIe GPUs.

According to a recent Dell Technologies [blog](#), “The Dell Pro Max portfolio integrates seamlessly as a key infrastructure option within the [Dell AI Factory with NVIDIA](#), offering one consistent experience with [NVIDIA AI Enterprise](#) software across systems. This software architecture ensures developers using Dell Pro Max with GB10 and Dell Pro Max with GB300 can move their models between environments – from desktop to DGX Cloud or Dell data center infrastructures – with virtually no code changes, delivering consistency and reducing downtime.”

Dell AI Factory with NVIDIA Advancements

At GTC, Dell Technologies announced new updates to the Dell AI Factory with NVIDIA. Dell has integrated NVIDIA’s

AI-Q Blueprint and AgentIQ Toolkit in the NVIDIA AI Enterprise platform, and the new Dell Accelerator Services for RAG “implement and optimize agentic-based solutions with integrated business data, maximizing ROI,” the company says.

In addition, Dell AI Factory with NVIDIA validates the NVIDIA Run:ai AI orchestration platform, and Dell Services for GenAI Digital Assistants now aligns with NVIDIA’s scalable blueprint architecture. The Dell AI Code Assistant offers a fully on-premises, enterprise-grade coding assistant that includes “the highest standards of flexibility and data privacy.”

Dell also announced AI data management solutions built on its relationship with NVIDIA. The Dell AI Data Platform with NVIDIA helps companies deploy agentic AI and other AI applications securely, through always-on, direct access to high quality structured, semi-structured and unstructured data. The platform combines Dell enterprise storage with NVIDIA accelerated computing, networking and AI software, and integrates with the NVIDIA AI Data Platform reference design. The platform also features Dell Data Management Services and Dell PowerScale storage, which can improve GPU utilization with faster data ingestion and retrieval. Dell Technologies also now supports NVIDIA Dynamo, which frees up GPU memory by offloading KV cache data from GPU-accelerated nodes to Dell storage like PowerScale.

CES 2025: NVIDIA Reveals **New Generative AI Models** for Omniverse

Company aims to advance AI applications in robotics, autonomous vehicles, and digital twins



At CES 2025 in Las Vegas, NVIDIA CEO Jensen Huang kicked off the conference, appearing alongside his digital avatar. “In the future, these AI agents are essentially digital workforces that will be working alongside your employees,” he predicted.

If you don’t know how to create an AI-powered agent or where to start, NVIDIA has some foundational technology pieces: NVIDIA Agentic Building Blocks, pretrained on NIMs (NVIDIA Inferencing Microservices), are a good starting point.

In design and simulation software, such agents could become a new way to deliver tech support or tutorials, as seen in AnsysGPT and other natural language-capable chatbots.

Get Ready for Physical AI

In Huang's vision, AI's performance is inseparably linked to its ability to digest and interpret real-world data, representing the physical world it interacts with. He said, "The next frontier of AI is physical AI. Model performance is directly related to data availability, but data of the real world is difficult to capture and label. NVIDIA Cosmos is the platform for developing physical AI."

[Cosmos](#) is a platform with state-of-the-art generative [world foundation models \(WFMs\)](#), advanced tokenizers, guardrails, and an accelerated video processing pipeline, NVIDIA revealed.

The company explained, "Cosmos WFMs are purpose-built for physical AI research and development, and can generate physics-based videos from a combination of inputs, like text, image and video, as well as robot sensor or motion data. The models are built for physically based interactions, object permanence, and high-quality generation of simulated industrial environments — like warehouses or factories — and of driving environments, including various road conditions."

These foundational models are physics-aware, making them able to mimic real-world objects' behaviors in the physical world. Physical AI development will likely accelerate digital twin development and adoption in manufacturing, where owners and operators seek to understand the implications of different industrial machinery and equipment configurations and layouts.

"Physical AI will revolutionize the \$50 trillion manufacturing and logistics industries. Everything that moves — from cars and trucks to factories and warehouses — will be robotic and embodied by AI," said Huang. "NVIDIA's

Omniverse digital twin operating system and Cosmos physical AI serve as the foundational libraries for digitalizing the world's physical industries."

Generative AI Models for Omniverse

NVIDIA expects the new generative AI models will speed up world building, labeling the world with physical attributes, and making it photorealistic — tasks that used to be manual, tedious, and time-consuming. This capacity could make Omniverse an engine to generate realistic training data on demand.

"NVIDIA Omniverse, paired with new NVIDIA Cosmos world foundation models, creates a synthetic data-multiplication engine — letting developers easily generate massive amounts of controllable, photoreal synthetic data. Developers can compose 3D scenarios in Omniverse and render images or videos as outputs. These can then be used with text prompts to condition Cosmos models to generate countless synthetic virtual environments for physical AI training," explained NVIDIA.

During his CES keynote, Huang also announced four new [blueprints](#), or reference workflows, aimed at the growing digital twins market:

- Mega, powered by Omniverse Sensor RTX APIs, for developing and testing robot fleets at scale;
- Autonomous vehicle simulation, powered by Omniverse Sensor RTX APIs, for autonomous car developers to replay driving data, generate new ground-truth data, and perform closed-loop testing;
- Omniverse spatial streaming to Apple Vision Pro for immersive digital visualization;
- Real-time digital twins for Computer Aided Engineering (CAE), a reference workflow built on NVIDIA CUDA-X acceleration, physics AI, and Omniverse libraries.



NVIDIA announces Project DIGITS, aiming to put AI PCs in the hands of data scientists, researchers, and students. Image courtesy of NVIDIA.

According to NVIDIA's announcement, Accenture, Altair, Ansys, Cadence, Foretellix, Microsoft, and Neural Concept are the early integrators of Omniverse. Siemens, a leader in industrial automation, also announced at the CES the availability of Teamcenter Digital Reality Viewer — the first Siemens Xcelerator application powered by NVIDIA Omniverse libraries.

The AI models are also expected to help autonomous vehicle development. With Omniverse and Cosmos, NVIDIA's AI data factory can scale hundreds of drives into billions of effective miles, Huang said. This lets car developers easily multiply the existing datasets to generate the volume required to train and test their vehicles.

Huang revealed that Toyota will be building its next-generation vehicles on the NVIDIA DRIVE AGX software and hardware platform including Drive AGX Orin SOC (system-on-a-chip), running the safety-certified NVIDIA DriveOS operating system.

A Grace Blackwell on Every Desk

Huang also revealed Project DIGITS, his ambitious goal to put a personal AI supercomputer on every desk. Huang wants to give researchers, data scientists, and students worldwide access to the power of NVIDIA Grace Blackwell superchips.

“With Project DIGITS, the Grace Blackwell Superchip comes to millions of developers,” said Huang. “Placing an AI supercomputer on the desks of every data scientist, AI researcher and student empowers them to engage and shape the age of AI.”

According to NVIDIA, the GB10 Superchip includes the NVIDIA Blackwell GPU with latest-generation CUDA cores and fifth-generation Tensor Cores, connected via NVLink chip-to-chip interconnect to a high-performance NVIDIA Grace CPU.




(NVIDIA also [announced](#) new Blackwell-based GeForce RTX 50 Series Desktop and Laptop GPUs.)

You can read more about NVIDIA at CES 2025 in this [blog](#).

NVIDIA Showcases AI Capabilities at **PTC Global Summit**

NVIDIA RTX GPUs and Dell Technologies
AI-ready workstations help enable advanced
design and engineering workflows.

WHAT DOES IT MEAN FOR YOU?
GPU ACCELERATION ACROSS PTC APPLICATIONS

PTC CREO	VUFORIA	ONSHAPE
 <p>3D ASSETS VISUALIZATION PHOTOREALISTIC RENDERING WITH CREO VISUALIZATION AND KEYSHOT SIMULATION-DRIVE DESIGN THROUGH GENERATIVE DESIGN AND TOPOLOGY OPTIMIZATION</p>	 <p>AR RENDERING AND VISUALIZATION OBJECT OVERLAY</p>	 <p>VISUALIZATION AND RENDERING OF 3D MODEL IN THE CLOUD LEVERAGES CLIENT GPU ACCELERATION FOR VIEWPORT</p>

NVIDIA

NVIDIA RTX GPUs and Dell Pro workstations can enable advanced design and engineering workflows. Images courtesy of Pietro Fabiani/NVIDIA.

At the [PTC Global Summit](#) in New Orleans at the end of January 2025, attendees were able to take advantage of sessions covering the latest updates and features of the full suite of PTC design, service, and PLM tools. There were also presentations from leading end users.

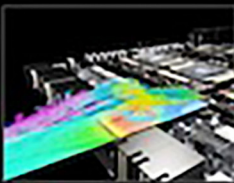
NVIDIA and Dell Technologies were also on hand to host a session titled “Optimizing Hardware Choices Across Different Applications and Stages of the Product Lifecycle,” that included hardware configuration tips for CAD/CAE/CAM, augmented/virtual reality, digital twins and more, and the significance of high-performance professional workstations for CAD and PLM software. The session also included an overview of AI (artificial intelligence) workstations and the role of NVIDIA RTX professional GPUs in these workflows.

than the previous generation. Fourth-generation tensor cores provide more than 2X the performance of the previous generation and support the new FP8 data format that reduces data storage and improves performance.

According to Fabiani, a key differentiator of NVIDIA RTX GPUs is that they are purpose built for professional workloads, and they are optimized across a variety of design and visualization workflows such as simulation, rendering, editing, and computer aided design, and offer ISV software certifications.

Manufacturing & Industrial AI use cases

DESIGN & SIMULATION



- Mechanical Design
- Electrical Design
- Fluids & Aerodynamics
- Structural Mechanics
- Lithography
- Materials & Chemicals
- Manufacturability

SMART MANUFACTURING



- Quality Inspection
- Industrial Video Analytics
- Robotics & Automation
- Worker Safety & Productivity
- Process Control
- Plant Planning

SUPPLY CHAIN & LOGISTICS



- Materials Handling
- Forecasting & Inventory Management
- Supply Chain Optimization

SERVICE & MAINTENANCE



- Field Inspection
- Predictive Maintenance
- Smart Field Services
- Asset Tracking
- Document Analytics

During the NVIDIA presentation, Pietro Fabiani, senior business development manager at NVIDIA, provided an overview of the NVIDIA Ada Lovelace GPU architecture. The Ada Lovelace architecture is designed to improve productivity and accelerate graphics, AI, rendering, and compute workloads.

The Ada Lovelace-based GPUs offer new streaming multiprocessors (CUDA cores) that provide up to 90 TFLOPS of single precision compute (FP32) performance, to accelerate graphics and compute up to 2X the previous generation. Third-generation RT cores provide up to 2X faster ray-triangle intersection

According to Fabiani, “In the manufacturing industry, NVIDIA RTX has been paramount to accelerating time to market for new products, making real-time photorealistic design and simulation possible to confidently build, visualize, and test concepts before going to production. And these benefits extend to the [architecture, engineering and construction] AEC industry as well, giving designers the ability to accurately visualize every aspect of individual rooms, huge buildings, or even massive cityscapes before committing to construction.”

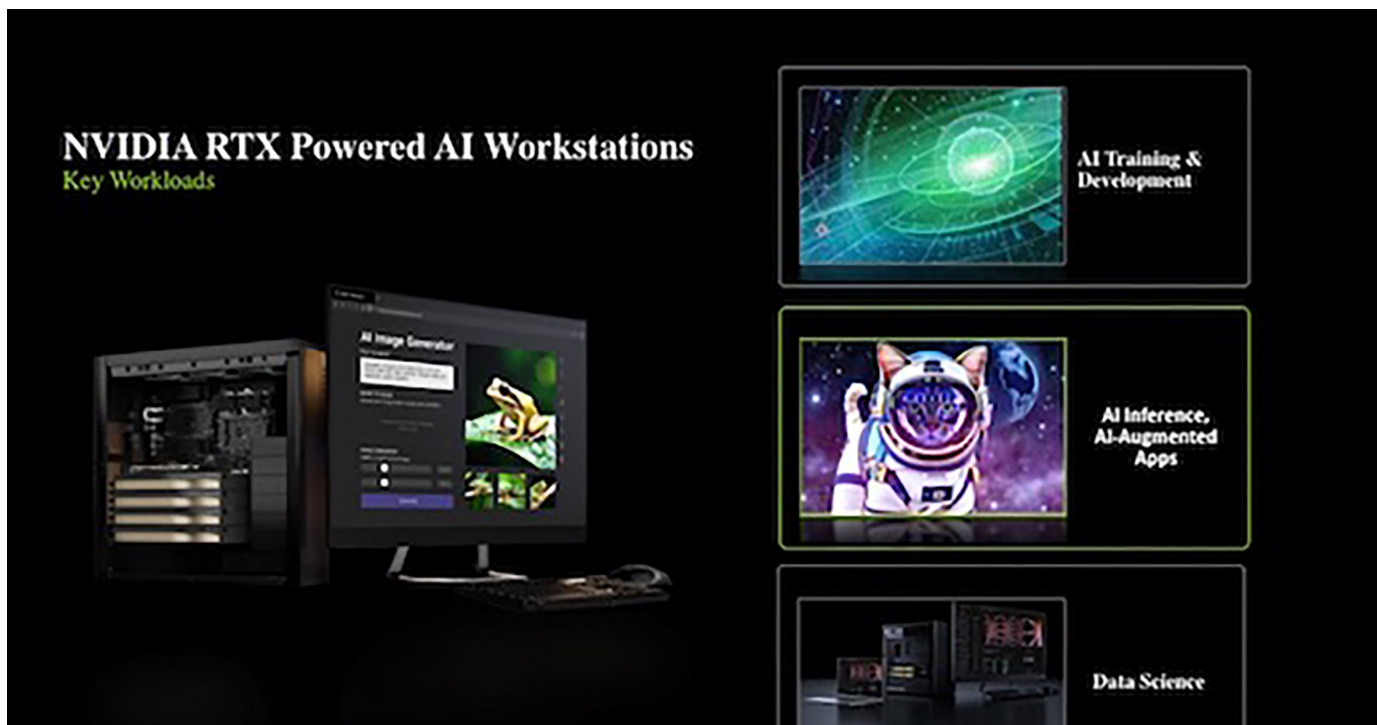
Fabiani added: “[Particleworks](#) already empowers

[PTC] Creo users with a GPU-accelerated solver, [Simerics](#) is in the process of rebuilding their core engine to run on GPU for the most complex simulations, and Ansys' integration providing real-time simulation during the design phase has been a total game changer, according to Creo users who stopped by our booth."

RTX GPUs also bring AI capabilities to all of these industries, as well as advancing critical scientific research – accelerating deep learning and machine learning use cases ranging all the way from medical

Fabiani also discussed the [NVIDIA Inference Microservice \(NIM\)](#), which he described as “the fastest, easiest, and most portable way of putting Generative AI models in production in five minutes or less.” (For more information on NVIDIA AI efforts, see our CES 2025 coverage [here](#).)

Ken Flannigan, Director of AEC Alliances and Solutions at Dell Technologies, provided information on the company's recent Performance PC rebranding (you can read more about that [here](#)), as well as the company's end-to-end AI solutions powered by



imaging to heliophysics, Fabiani said.

During the presentation, he explained that NVIDIA partner ISVs are integrating AI into their engineering applications, and that generative AI will drive new features and functionality.

Workstations can offer multi-user inference for smaller AI models thanks to the capabilities of the GPU. The presentation also provided examples of how a professional workstation can be used for Retrieval Augmented Generation (RAG), which enables additional data beyond the AI model's original training to be used to provide better output from the model

NVIDIA RTX GPUs. The Dell Pro Max AI PCs include a range of NVIDIA GPUs for graphics and parallel processing, as well as Intel neural processing units (NPUs) specifically for AI tasks.

Fabiani noted that AI workstations can run local large language models (LLMs), small language models (SLMs), diffusion models and more, and support NVIDIA AI Enterprise to facilitate generative AI development and deployment.

Note: Since this article was published, NVIDIA has released a new generation of NVIDIA Blackwell GPUs, and rebranded its professional GPUs as [NVIDIA RTX PRO](#).