



NVIDIA Announces Omniverse Real-Time Physics Digital Twins With Industry Software Leaders

Blueprint for Interactive Virtual Wind Tunnels Enables Unprecedented Computer-Aided Engineering Exploration for Altair, Ansys, Cadence, Siemens and More

SC24—NVIDIA today announced an NVIDIA Omniverse™ Blueprint that enables industry software developers to help their computer-aided engineering (CAE) customers in aerospace, automotive, manufacturing, energy and other industries create digital twins with real-time interactivity.

Software developers such as Altair, [Ansys](#), [Cadence](#) and Siemens can use the [NVIDIA Omniverse Blueprint for real-time computer-aided engineering digital twins](#) to help their customers drive down development costs and energy usage while getting to market faster. The blueprint is a reference workflow that includes NVIDIA acceleration libraries, physics-AI frameworks and interactive physically based rendering to achieve 1,200x faster simulations and real-time visualization.

“We built Omniverse so that everything can have a digital twin,” said Jensen Huang, founder and CEO of NVIDIA. “Omniverse Blueprints are reference pipelines that connect NVIDIA Omniverse with AI technologies, enabling leading CAE software developers to build groundbreaking digital twin workflows that will transform industrial digitalization, from design and manufacturing to operations, for the world’s largest industries.”

One of the first applications of the blueprint is computational fluid dynamics (CFD) simulations, a critical step to virtually explore, test and refine the designs of cars, airplanes, ships and many other products. Traditional engineering workflows — from physics simulation to visualization and design optimization — can take weeks or even months to complete.

In an industry first, NVIDIA and [Luminary Cloud](#) are demonstrating at SC24 a [virtual wind tunnel](#) that allows users to simulate and visualize fluid dynamics at real-time, interactive speeds, even when changing the vehicle model inside the tunnel.

Unifying Three Pillars of NVIDIA Technology for Developers

Building a real-time physics digital twin requires two fundamental capabilities: real-time physics solver performance and real-time visualization of large-scale datasets.

The Omniverse Blueprint achieves these by bringing together [NVIDIA CUDA-X™](#) libraries to accelerate the solvers, the [NVIDIA Modulus](#) physics-AI framework to train and deploy models to generate flow fields, and [NVIDIA Omniverse application programming interfaces](#) for 3D data interoperability and real-time RTX-enabled visualization.

Developers can integrate the blueprint as individual elements or in its entirety into their existing tools.

Ecosystem Uses NVIDIA Blueprint to Advance Simulations

[Ansys](#) is the first to adopt the Omniverse Blueprint, applying it to Ansys Fluent fluid simulation software to enable accelerated CFD simulation.

Ansys ran Fluent at the Texas Advanced Computing Center on 320 NVIDIA GH200 Grace Hopper Superchips. A 2.5-billion-cell automotive simulation was completed in just over six hours, which would have taken nearly a month running on 2,048 x86 CPU cores, significantly enhancing the feasibility of overnight high-fidelity CFD analyses and establishing a new industry benchmark.

“By integrating NVIDIA Omniverse Blueprint with Ansys software, we’re enabling our customers to tackle increasingly complex and detailed simulations more quickly and accurately,” said Ajei Gopal, president and CEO of Ansys. “Our collaboration is pushing the boundaries of engineering and design across multiple industries.”

Luminary Cloud is also adopting the blueprint. The company’s new simulation AI model, built on [NVIDIA Modulus](#), learned the relationships between airflow fields and car geometry based on training data generated from its GPU-accelerated CFD solver. The model runs simulations orders of magnitude faster than the solver itself, enabling real-time aerodynamic flow simulation that is visualized using Omniverse APIs.

Altair, Beyond Math, Cadence, Hexagon, [Neural Concept](#), Siemens, SimScale and Trane Technologies are also exploring adoption of the Omniverse Blueprint into their own applications.

The Omniverse Blueprint can be run on all leading cloud platforms, including Amazon Web Services, Google Cloud, Microsoft Azure and Oracle Cloud Infrastructure. It is also available on [NVIDIA DGX™ Cloud](#).

[Rescale](#), a cloud-based platform that helps organizations accelerate scientific and engineering breakthroughs, is using the NVIDIA Omniverse Blueprint to enable organizations to train and deploy custom AI models in just a few clicks.

The Rescale platform automates the full application-to-hardware stack and can be run across any cloud service provider. Organizations can generate training data using any simulation solver; prepare, train and deploy the AI models; run inference predictions; and visualize and optimize models.

Availability

Companies interested in learning more about the NVIDIA Omniverse Blueprint for real-time computer-aided engineering digital twins can [sign up for early access](#).

About NVIDIA

[NVIDIA](#) (NASDAQ: NVDA) is the world leader in accelerated computing.

Certain statements in this press release including, but not limited to, statements as to: the benefits, impact, and performance of NVIDIA's products, services, and technologies, including NVIDIA Omniverse Blueprint, NVIDIA CUDA-X libraries, NVIDIA Modulus physics-AI framework, NVIDIA NIM microservice, NVIDIA GH200 Grace Hopper Superchip, and NVIDIA DGX Cloud; NVIDIA's collaborations with third parties and the benefits and impact thereof; third parties using or adopting our products and technologies, the benefits and impact thereof, and the features and performance of their offerings; and Omniverse Blueprints enabling leading CAE software developers to build groundbreaking digital twin workflows that will transform industrial digitalization, from design and manufacturing to operations, for the world's largest industries are forward-looking statements that are subject to risks and uncertainties that could cause results to be materially different than expectations. Important factors that could cause actual results to differ materially include: global economic conditions; our reliance on third parties to manufacture, assemble, package and test our products; the impact of technological development and competition; development of new products and technologies or enhancements to our existing product and technologies; market acceptance of our products or our partners' products; design, manufacturing or software defects; changes in consumer preferences or demands; changes in industry standards and interfaces; unexpected loss of performance of our products or technologies when integrated into systems; as well as other factors detailed from time to time in the most recent reports NVIDIA files with the Securities and Exchange Commission, or SEC, including, but not limited to, its annual report on Form 10-K and quarterly reports on Form 10-Q. Copies of reports filed with the SEC are posted on the company's website and are available from NVIDIA without charge. These forward-looking statements are not guarantees of future performance and speak only as of the date hereof, and, except as required by law, NVIDIA disclaims any obligation to update these forward-looking statements to reflect future events or circumstances.

Many of the products and features described herein remain in various stages and will be offered on a when-and-if-available basis. The statements above are not intended to be, and should not be interpreted as a commitment, promise, or legal obligation, and the development, release, and timing of any features or functionalities described for our products is subject to change and remains at the sole discretion of NVIDIA. NVIDIA will have no liability for failure to deliver or delay in the delivery of any of the products, features or functions set forth herein.

© 2024 NVIDIA Corporation. All rights reserved. NVIDIA, the NVIDIA logo, CUDA-X, NVIDIA DGX, and NVIDIA Omniverse are trademarks and/or registered trademarks of NVIDIA Corporation in the U.S. and/or other countries. Other company and product names may be trademarks of the respective companies with which they are associated. Features, pricing, availability, and specifications are subject to change without notice.

Kristin Uchiyama
Enterprise and Edge Computing
+1-408-486-2248
kuchiyama@nvidia.com