

NVIDIA Introduces 60+ Updates to CUDA-X Libraries, Opening New Science and Industries to Accelerated Computing

New Capabilities Accelerate Work in Quantum Computing and 6G Research, Logistics Optimization Research, Robotics, Cybersecurity, Genomics and Drug Discovery, Data Analytics and More

GTC—NVIDIA today unveiled more than 60 updates to its CUDA-X™ collection of libraries, tools and technologies across a broad range of disciplines, which dramatically improve performance of the [CUDA® software computing platform](#).

Dozens of updates are immediately available, reinforcing CUDA's position as the industry's most comprehensive platform for developers to build accelerated applications to address challenges across high performance computing fields such as research in 6G, quantum computing, genomics, drug discovery and logistics optimization, as well as advanced work in robotics, cybersecurity, data analytics and more.

The CUDA platform has been downloaded more than 33 million times since its introduction in 2008, with 8 million downloads in 2021 alone, up 3x in three years.

"Innovation in AI and accelerated computing is driving major scientific breakthroughs and the creation of new applications and services in virtually every industry," said Greg Estes, vice president of Developer Programs at NVIDIA. "With these updates, NVIDIA is making it easier than ever for researchers and developers to take advantage of the power of CUDA and get the highest performance from our platforms."

Built on top of CUDA, NVIDIA's platforms for AI, HPC and graphics include software development kits and tools that are at the heart of enabling higher performance and accelerated algorithms across multiple application domains. The SDKs make it easy for developers, researchers and data scientists to tap into the power of NVIDIA's advanced platform, tackling the immense complexity at the intersection of computing, algorithms and science.

These updates make the NVIDIA systems that developers already use across science, AI and data processing even faster. Highlights include:

- [cuQuantum](#), for accelerating quantum circuit simulation, is now in general availability and, for the first time, available in the cuQuantum DGX Appliance, which provides HPC researchers a full quantum simulation stack optimized for deployment on the NVIDIA DGX™ platform. A key element in a rapidly expanding ecosystem, cuQuantum is now integrated as a backend in popular simulators from Google Quantum AI, [Xanadu](#) and Oak Ridge National Laboratory. It is also now being offered as a part of quantum application development platforms from Classiq and Zapata Computing, and is being used by QC Ware, Xanadu and others to power quantum research at scale in areas from chemistry to climate modeling.
- [Sionna](#)™, for 6G physical-layer research, is a new, GPU-accelerated, open-source library, with native support for the integration of neural networks and machine learning. Sionna enables rapid prototyping of complex communication system architectures and adds to NVIDIA's investment in the wireless domain, which includes Aerial, a unified software-defined platform for delivering AI-on-5G.
 - "Sionna will transform the way AI/ML-based communication systems are developed in the future," said Christoph Studer, professor in the Department of Information Technology and Electrical Engineering at ETH Zürich. "Even better, it runs incredibly fast on our NVIDIA DGX Station."
- [RAPIDS](#)™, data science libraries to accelerate drug discovery, social connections, fraud detection and more, is one of NVIDIA's most popular SDKs with 2 million downloads and leveraged in over 5,000 projects on GitHub. The [RAPIDS Accelerator for Apache Spark](#) speeds processing by over 3x with no code changes. With 80 percent of the Fortune 500 using Apache Spark in production, data engineers can transparently accelerate Spark dataframe and SQL operations.
- [cuOpt](#), formerly ReOpt, for logistics optimization research focused on vehicle routing, enables users to route thousands of packages to thousands of locations in mere seconds with record accuracy — enabling real-time rerouting and saving potentially billions in delivery costs each year.
- [Morpheus](#), for cybersecurity applications, makes it possible to analyze up to 100 percent of one's data in real time, for more accurate detection and faster remediation of threats as they occur. F5 achieved 200x performance improvements to its malware detection model, going from 1,013 messages per second to 208,333 messages per second, with just 136 lines of code.
- [DGL container](#), for training graph neural networks, adds algorithm improvements delivering 4x faster end-to-end ETL and training workflows than CPUs in areas such as drug discovery and fraud detection.
- [Nsight™ Systems](#), for system-wide visualization of an application's performance, allows developers to see how GPU-

accelerated libraries use system resources, interact with the application and identify optimization opportunities to reduce bottlenecks.

Among other libraries being updated are MONAI, for medical imaging; NVIDIA FLARE™, for federated learning, with nearly 300,000 downloads; Maxine, for reinventing communications; Riva, for speech AI; Merlin, for recommender systems; and Isaac™, for robotics.

Join the 3 million developers already enjoying benefits, such as access to training courses and materials through the NVIDIA [Deep Learning Institute](#), technical talks and tools, by registering for the [NVIDIA Developer program](#).

To learn more about CUDA-X libraries, watch the [GTC 2022 keynote](#) from NVIDIA CEO Jensen Huang. [Register for GTC for free](#) to attend sessions with NVIDIA and industry leaders, such as [CUDA: New Features and Beyond](#).

About NVIDIA

[NVIDIA](#)'s (NASDAQ: NVDA) invention of the GPU in 1999 sparked the growth of the PC gaming market and has redefined modern computer graphics, high performance computing and artificial intelligence. The company's pioneering work in accelerated computing and AI is reshaping trillion-dollar industries, such as transportation, healthcare and manufacturing, and fueling the growth of many others. More information at <https://nvidianews.nvidia.com/>.

Certain statements in this press release including, but not limited to, statements as to: the benefits, impact, specifications, and performance of our products and technologies, including the CUDA-X collection, the CUDA software computing platform, cuQuantum, Sionna, RAPIDS, cuOpt, Morpheus, DGL container, Nsight Systems, MONAI, Maxine, Riva, Merlin and Isaac; innovation in AI and accelerated computing driving major scientific breakthroughs and the creation of new applications and services in virtually every industry; NVIDIA making it easier than ever for researchers and developers to take advantage of the power of CUDA and get the highest performance from our platforms; and the rapidly expanding ecosystem in which cuQuantum is a key element 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.

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