Synopsys Demonstrates Framework for Optimizing Manufacturing Processes with Digital Twins at Microsoft Ignite

The framework, featuring NVIDIA Omniverse libraries, NVIDIA CUDA-X libraries, Microsoft Azure, and accelerated Synopsys physics, has demonstrated the ability to optimize bottle filling assembly lines in near real time and expand the accessibility of simulation-driven insight

Key Highlights

- A blueprint for realizing the promise of digital transformation, the open-source framework features GPU native Ansys Fluent® fluid simulation software that integrates NVIDIA Omniverse libraries and cloud computing for scalable deployment
- First adopted by Krones AG, this jointly developed solution enabled a physically accurate virtual assembly line delivering real-time optimization and scenario comparison
- The framework, designed for customized deployments tailored to meet specific business needs, establishes a foundation for verticalized solutions that deliver physics-informed insights for next-generation agility

SUNNYVALE, Calif., Nov. 18, 2025 /PRNewswire/ -- Synopsys, Inc. (NASDAQ: SNPS), alongside technical collaborators at Microsoft Ignite, today unveiled a simulation-driven framework for optimizing dynamic manufacturing processes in real time. First deployed by Krones, a leader in fully integrated packaging and bottling line systems, the framework was used to create a physically accurate virtual assembly line with optimization outputs accounting for critical variables, such as bottle shape, liquid viscosity, and fill level.

Optimizing production workflows in real time is a longstanding challenge for manufacturers. Conventional computational fluid dynamic (CFD) simulations provide powerful, high-fidelity insights but can take hours to complete. Synopsys' GPU-accelerated, cloud-native simulation solver is transforming a business challenge into a competitive advantage by slashing simulation workloads from 3-4 hours to less than 5 minutes, unlocking rapid scenario analyses and continuous improvements. OpenUSD is key to this solution, seamlessly enabling interoperability across computer-aided engineering (CAE) tools and platforms, so teams can rapidly collaborate and iterate on simulation results — unlocking smarter, more efficient engineering at every stage.

Krones has achieved an industry-first deployment that exemplifies the promise of digital transformation and technological collaboration. Ansys Apex Channel Partner CADFEM Germany GmbH customized the Ansys Fluent solver settings for Krones' unique needs resulting in efficiencies that amplified GPU acceleration. Leveraging Omniverse libraries, the Ansys Access on Microsoft Azure™ accelerated cloud computing solution, and SoftServe's system integration and deployment expertise, the Krones engineering team viewed these near real-time simulation results within a digital twin of a full factory floor.

Key benefits include:

- Real-time scenario comparison and optimization, enabling immediate adjustments and data-driven decision-making
- Smarter resource allocation, significantly reducing product waste and improving efficiency
- Enhanced collaboration between engineering, operations, and R&D teams with faster feedback loops

The framework builds on Synopsys' integration of OpenUSD-based Omniverse libraries and technologies, establishing a foundation for a wide variety of simulation-driven, custom-built applications across industries. These applications are designed to expand the number of potential simulation users and use cases, such as assisting heart surgeons in the operating room.

"For manufacturers, the ability to optimize dynamic processes in real-time has been a massive challenge, as traditional, high-fidelity simulation is often too slow to be practical for immediate factory-floor decisions," said Rev Lebaredian, Vice President of Omniverse and Simulation Technology at NVIDIA. "By integrating Synopsys' accelerated physics solvers and NVIDIA Omniverse libraries on the Microsoft Azure cloud, this open framework allows manufacturers to simulate entire factory floors, test scenarios, and optimize operations in real time without disrupting physical systems."

"It's remarkable what can be accomplished when working with technology partners who share a relentless focus on solving customer challenges," said Prith Banerjee, Senior Vice President of Simulation & Analysis Incubation at Synopsys. "This framework is a testament to how cross-industry collaboration and open ecosystem partnerships are reshaping the future of industrial innovation. It marks a major step toward scalable, intelligent simulation-driven applications that will be pivotal to ushering in the next phase of digital transformation."

"Microsoft Azure provides the high-performance cloud foundation manufacturers need to unlock the full potential of AI and simulation," said Dayan Rodriguez, Corporate Vice President, Manufacturing and Mobility at Microsoft. "This collaboration

enables customers to accelerate operations and maximize agility."

Visit the NVIDIA Booth #939 at Microsoft Ignite for live demos and one-on-one discussions with NVIDIA, Microsoft, and Synopsys experts.

About Synopsys

Synopsys, Inc. (Nasdaq: SNPS) is the leader in engineering solutions from silicon to systems, enabling customers to rapidly innovate AI-powered products. We deliver industry-leading silicon design, IP, simulation and analysis solutions, and design services. We partner closely with our customers across a wide range of industries to maximize their R&D capability and productivity, powering innovation today that ignites the ingenuity of tomorrow. Learn more at www.synopsys.com.

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