

The endless possibilities of digital twins

An overview of the challenges, benefits, and use cases for the technology that's transforming industries

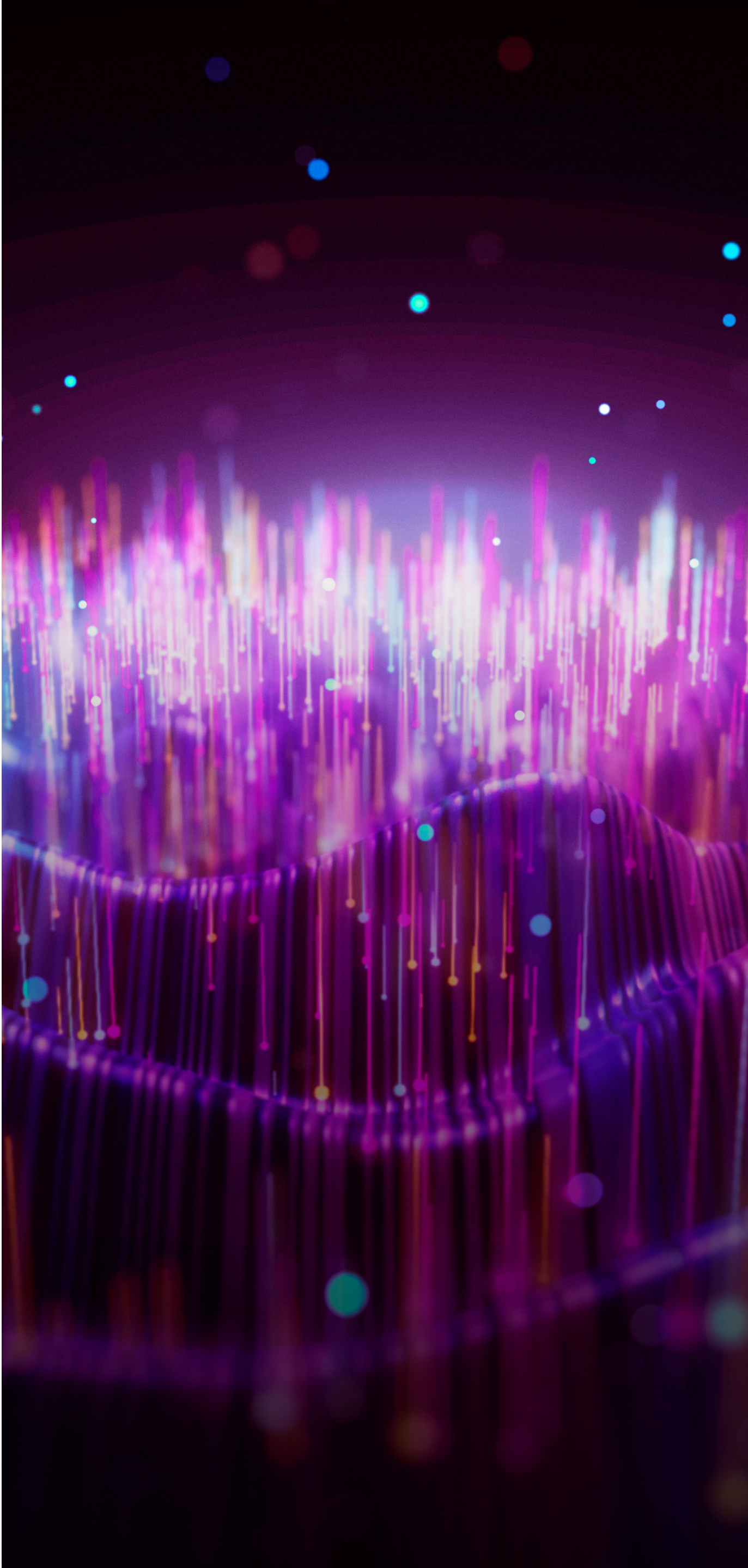


Smarter
technology
for all

Lenovo



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01. Introduction

Powering optimization and innovation

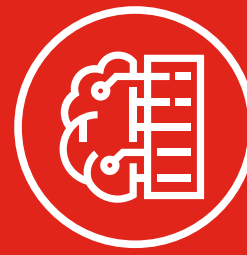
Digital twins are enhancing innovation and competitiveness for businesses of all sizes across many industries. It's no surprise that most industry leaders have already adopted this technology with great effect.



In advanced industries, survey data indicates that almost 75 percent of companies have already adopted digital twin technologies that have achieved at least medium levels of complexity.”¹

¹ **Digital twins: The key to smart product development**, McKinsey & Company, July 2023.

² **Digital Twins and Living Models at NASA**, NASA, November 2021.



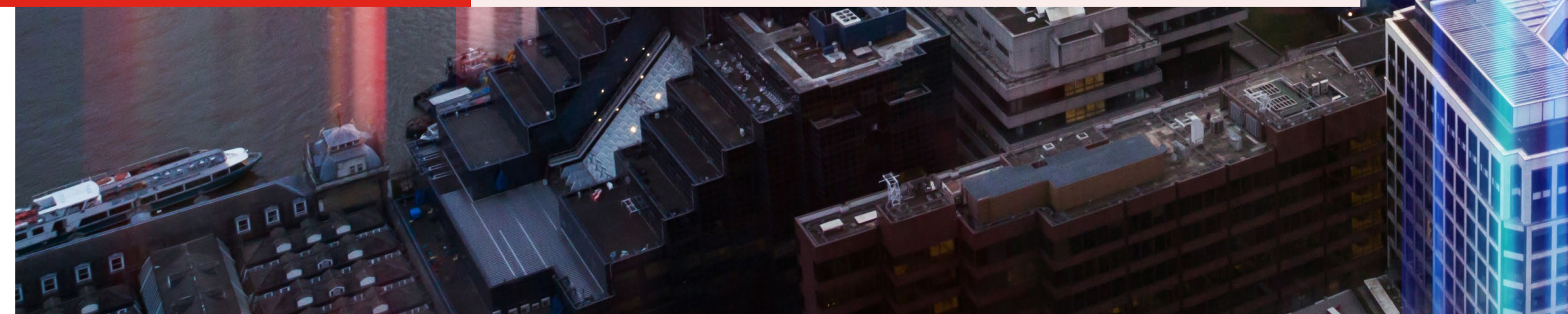
The ultimate sandbox

A digital twin is a virtual simulation of real-world assets, process, or entire environments. Digital twins enable organizations to simulate, test and adapt multiple different scenarios virtually—in full fidelity before making any investments in the real world. This includes the ability to optimize assets in real time. These next-generation digital twins reflect the laws of physics and are linked to real-world sensors and technology, further enabled by AI, including GenAI.



“Houston, we have a problem”

According to Nasa, the first example of a digital twin was more than 50 years ago when NASA experts brought the Apollo 13 spaceship and crew home safely after an explosion damaged the ship.² Mission Control teams replicated, diagnosed, and solved the problem with simulators used to train astronauts and flight controllers for the mission.





02. Unifying data

Overcoming the data language challenge



Digital twins rely on 3D representation to provide a realistic visualization and precise simulation. However, the primary challenge lies in the conversion process.”³

In most organizations, digital assets are inherently disparate, making it challenging to connect these diverse data sets to produce useful and actionable insights. Developing a unified digitized strategy is crucial for enabling data to be utilized more effectively, particularly within a digital twin environment.

For digital twin models to be effective, organizations must structure and rationalize data into a common format, allowing it to be used seamlessly across multiple unified systems.

Through existing accelerated AI Frameworks developed by companies such as NVIDIA, this data, which was in disparate processes, can now be consolidated and connected. This data can then be combined and used with 3D OpenUSD-compatible assets to create physically accurate copies of physical worlds in products such as NVIDIA Omniverse™ Enterprise.

³ **4 Digital Twin Challenges To Overcome For Better Business Decision-Making**, Forbes, October 2023

03. Benefits and advice

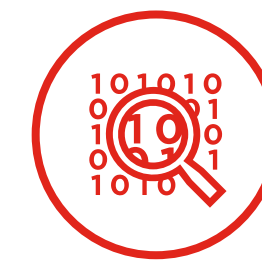
A multitude of benefits

In today's dynamic business landscape, achieving operational excellence is paramount, and digital twins emerge as a transformative technology, offering a powerful and data-driven approach to optimize organizations. This innovative solution unlocks a multitude of benefits, accelerating processes, enhancing decision-making, and propelling you toward a future of sustainable success.



Accelerated go-to-market & enhanced quality

Foster seamless collaboration across geographically dispersed teams with a unified single source of truth. This ensures faster development cycles, improved communication and superior product quality.



Data-driven decision-making & strategic insights

Gain a competitive edge with actionable insights derived from comprehensive data analysis. Make strategic decisions with confidence, informed by a clear understanding of assets and operations.



Sustainable practices & environmental impact

Embrace sustainability with digital twins through production transparency, extended equipment lifespans and minimizing waste.



Predictive maintenance & maximized asset performance

Leverage real-time asset data for proactive monitoring and optimization. Predict maintenance needs with precision, minimizing downtime and ensuring optimal asset performance.

03. Benefits and advice



Streamlined operations & optimized productivity

Revolutionize processes for peak efficiency. Digital twins empower organizations to streamline workflows, maximizing output and achieving significant productivity gains, all while staying secure and compliant.



Innovation, reliability, & profitability

Digital twins empower organizations to foster innovation and ensure operational reliability, which reduces waste to achieve long-term increased revenue.



Everything you need to create your first digital twin

Many organizations are unsure where to start and think the initial investment needed is too large. Lenovo advises starting with a pilot project to test the technology and measure ROI before making larger investments.

For these pilot projects, you don't need to invest in big servers and can instead invest in powerful workstations, which may be all you need. Not only does Lenovo offer a wide range of powerful workstations, we are in a unique position to offer the industry's broadest range of solutions, supporting organizations from initial consultation all the way to implementation and services.

When you are ready to start or scale, you can leverage Lenovo's industry-leading devices like ThinkStation workstations, ThinkSystem servers, ThinkReality VR tools, and flexible TruScale services. Lenovo's solution is grounded with the NVIDIA Omniverse Enterprise Platform, which means businesses have everything they need to create their first digital twin.

Choosing your first use case

Digital twins can help you overcome so many problems, but how do you decide which one to solve first? Here are four steps to help you choose your first use case.

01.

Focus on the business challenge

The ideal use case for a digital twin is one where you can solve a business challenge and see results quickly. Look for areas whereby solving inefficiencies will result in the highest gains.

02.

Look for robust and reliable data

It's crucial to choose an environment with sufficient high-quality data to ensure your digital twin effectively mirrors real-world conditions. Inadequate or poor-quality data can lead to flawed models and incorrect insights, compromising decision-making and system optimization.

03.

Environments you can scale in

Select an area where you can start with a smaller project—such as a product or a single production line—then test it, improve it, and scale it up to other areas of your organization.

04.

Tackle complex challenges

Once you have tried and tested a digital twin in a pilot project, and your organization has confidence in the investment needed, you can focus on more complex business challenges. You can consider one with higher cost and higher stakes, as this will deliver the greatest financial reward. Look for dynamic environments where inefficiencies and their root causes are difficult to identify.

05. Use Cases

A wealth of applications across industries

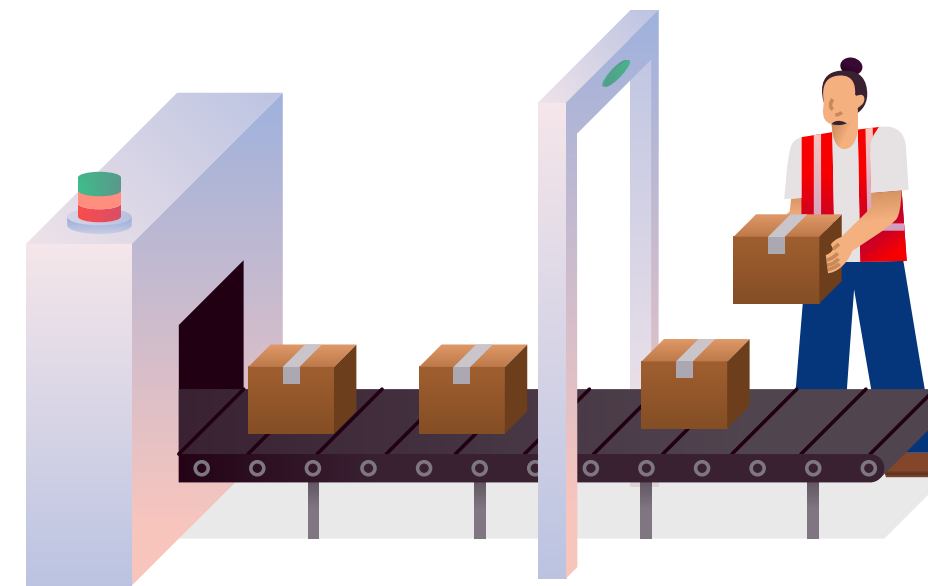
AI and digital twin technologies are evolving fast, and the number of applications is growing every day. Discover the art of possible with these six common industry-focused use cases.

[Click on each industry to discover more.](#)

01 Improving product concept and design



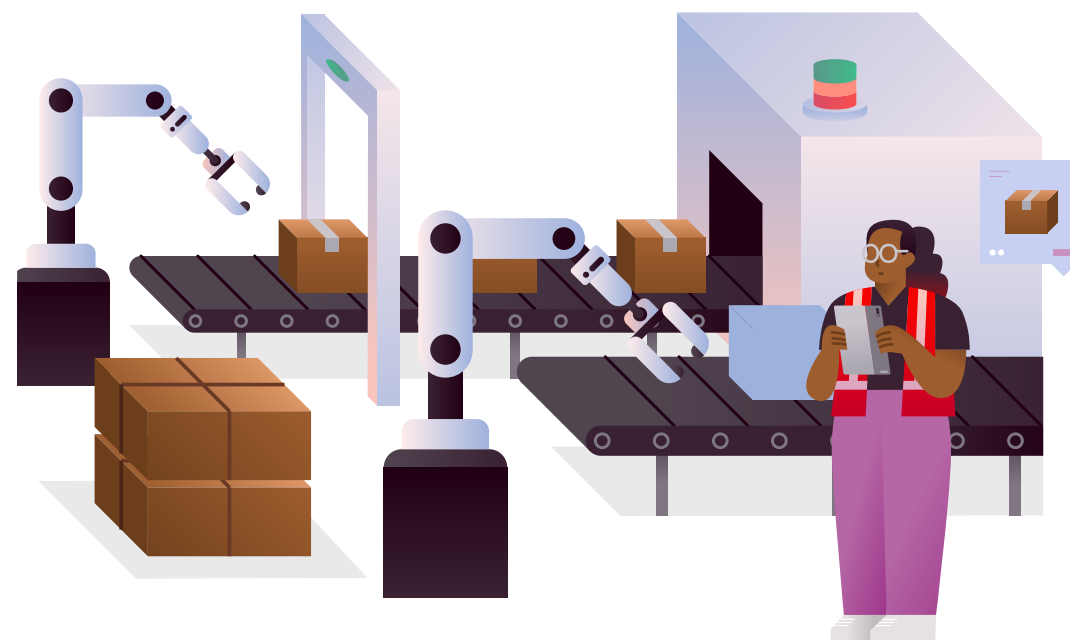
02 Increasing production line efficiencies



03 Optimizing warehouses and distribution centers



04 Enabling the factory of the future



05 Revolutionizing retail floor planning



06 Rethinking the way we live





05. Use Cases



World leader in artificial intelligence computing

NVIDIA Omniverse Enterprise is a platform of APIs, services, and software development kits (SDKs) that enable developers to build generative-AI-enabled tools, applications, and services for industrial digitalization workflows.

Applications built on Omniverse Enterprise core technologies fundamentally transform complex 3D workflows, allowing individuals and teams to build unified tools and data pipelines and simulate large-scale, physically accurate virtual worlds for industrial and scientific use cases.

Discover more

Whether you're new to digital twins and AI, or you've already identified your first use case, we can help you build solid strategies for planning, development, and innovation.

Get in touch with your Lenovo representative, or **contact us** via our website and get a head start on implementing digital twins into your business.



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