

Bring AI to your data with a digital twin

Previously unimagined capabilities are becoming possible

The digital twin concept is not new, but the underlying technology has sufficiently advanced to provide high-fidelity twins with previously unimagined capabilities, and the potential value is heightened by the added benefits of AI innovations.

Here are some examples of business value benefits you can anticipate from digital twins:

- **Mitigate risks** – reduce risks of accidents or damage and forecast maintenance needs and timing based on rigorous simulations of extreme or unusual situations.
- **Improve customer service** – deliver better and safer products in a faster manner to your customers.
- **Optimize operations** – drive efficiencies by modeling processes and simulating adjustments to discover cost-saving opportunities.
- **Increase design quality** – improve end-products with simulations of all aspects of design choices and the opportunity for simplified collaboration with stakeholders.
- **Enhance security** – utilize data while maintaining privacy, mitigating risk, and ensuring compliance.
- **Reduce time to market** – accelerate development with rapid iterations, reducing wasted time and resources.

The digital twin sector is expected to reach over **\$140 billion** by 2031, with a compound annual growth rate (CAGR) of **38.7%**.¹

AI ushers in a new era of digital twin enhancements

AI enhances digital twins, particularly when it comes to AI modeling and analytics capabilities, in the following ways:

- **Intelligent risk and anomaly detection** – by integrating AI algorithms into digital twin models, you can gain even more valuable insights into the health and operational status of the subject.
- **Predictive insights and suggestions** – AI also makes digital twins smarter, acting as an inferencing engine to analyze its own behavior and whether to retrain or adjust models.
- **Improved decision-making and automation** – when you bring GenAI to a digital twin, you can get a cognitive digital twin with the ability to make informed suggestions, automate tasks, and determine how to react to new situations

Enhancements like these are why **AI is poised to deliver up to \$1 trillion in productivity gains**.²

What is a digital twin?

Digital Twin Consortium defines digital twins as *virtual representations of real-world entities and processes, synchronized at a specified frequency and fidelity*.³

Digital twins can be thought of as three elements:

1. A real-world entity and/or process to be twinned
2. A virtual representation of that object and/or process.
3. The data that connects them together

Digital Twins offer the ability to evolve as reality changes, and they are of most use when an asset or process is changing over time. Unlike a simulation, a digital twin can provide a near-real-time comprehensive linkage between the physical and digital worlds.

This interactivity between the real and digital worlds yields realistic models which can make predictions with a high level of confidence and support a broad set of applications.



A Digital Twin is not a single product to be procured, but instead a complete ecosystem of different software and hardware solutions - all integrated together to achieve a desired outcome.

Building a successful digital twin involves many considerations

Legacy infrastructure – digital twins require high performance compute and modern infrastructure, and many IT environments (and OT environments) need to be modernized.

Data management and quality – it may be difficult to gather and process large complex data sets, and to maintain the quality and consistency of that data.

Data security – additional cyber security oversight and capabilities are needed to ensure protection of sensitive business process parameters and design.

Project complexities – digital twins can be difficult and expensive to create, requiring in-depth process understanding and system design, and coordinating expectations and decision-making across both IT and OT teams.

Connectivity and synchronization – there will be robust connectivity requirements to synchronize physical and digital worlds.

Standardization – it is challenging to coordinate tasks such as data collection, integration with modern digital twin technologies, and ensuring compatibility across existing infrastructure and digital twin solutions where standards and norms might not have been established. Furthermore, many organizations use inconsistent terms and definitions.

ROI expectations – digital twin projects may be inconsistent delivering immediate ROI and it may be difficult to quantify benefits.

Your partnership begins with the Dell AI Factory

The Dell AI Factory represents Dell's approach for embracing and implementing AI to meet the specific demands of a wide range of AI use cases, including digital twins. The Dell AI Factory is not a product, it is a system – a blueprint we put into action with our customers as they build their own AI factories to generate the various use cases that can deliver a wide range of desired outcomes.

The Dell AI Factory helps maximize the value of data, the raw material that powers the AI factory, to achieve desired outcomes. There are three components of the framework that harness the power of data – the foundation platform is Dell's end-to-end AI-optimized infrastructure portfolio, which is complemented by an open ecosystem of deep partnerships with leading vendors and AI companies. The final ingredient is the insight and know-how made possible through a comprehensive suite of AI services – from strategy and planning to implementation and scaling.

Why partner with Dell AI Factory for digital twins?

Data leader

No one has more storage and more data capacity sold across the globe. Data is the name of the game, and more people trust Dell infrastructure with their data than any other vendor. Our comprehensive AI services and data management solutions also help ensure data readiness.

Extensive AI and edge portfolio

Dell offers the one-stop-shop for end-to-end solutions, right-sized for use cases such as digital twins.

Broad AI ecosystem

Dell has a broad, open AI ecosystem that offers validated, optimized solutions to make AI simpler and trusted including digital twin partnerships with NVIDIA Omniverse and XMPPro.

Next steps

Get started with a fee-waived Accelerator Workshop, which can help you gain consensus among your business and technical stakeholders on your digital twin solution and business priorities.



Learn more about Dell solutions for [AI](#) and Dell solutions for [Edge](#).



Learn more about [Dell AI Services](#).



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1 Research and Markets, "Digital Twin Market Size and Forecast 2021-2031, Global and Regional Share, Trend, and Growth Opportunity Analysis Report," June 2024

2 Based on the IDC InfoBrief commissioned by Dell Technologies: "Workforce Upskilling for the AI Era," January 2024

3 Source: <https://www.digitaltwinconsortium.org>