

TO2. Digital Twins

Digital representations of physical networks, assets and process that support asset management and decision making.



TECHNOLOGY DESCRIPTION

According to the Digital Twin Consortium (<https://www.digitaltwinconsortium.org>), a Digital Twin (DT) is an integrated data-driven virtual representation of real-world entities and processes, with synchronized interaction at a specified frequency and fidelity.

DTs can be used to model and compare scenarios, predict future behaviour and optimise operations or minimize risks to the real-world entity.

For Asset Managers, DTs of interest will include those of physical infrastructure networks, assets and operational processes.

DTs can provide the following capabilities: data services; integration; intelligence; user interface; management; and trustworthiness.

(<https://www.digitaltwinconsortium.org/initiatives/capabilities-periodic-table/>)

A DT is rarely implemented by only one software product. An organization is more likely to need a DT platform, consisting of multiple software products that share data to support different business use cases.

A DT has a life cycle in alignment with the asset life cycle.

SAMPLE USE CASES:

Predictive Maintenance

What is the optimal time to maintain an asset. This uses historical and real-time data combined with AI to build an asset DT and predict the Remaining Useful Life (RUL).

CO2 Reduction

A DT of a building or asset can allow intelligent, automated energy management, reducing energy consumption to save CO2.

Safety Improvements

Through real-time monitoring of operational assets the DT can identify risks, before they become issues.

Stick to standards: Industry associations like the Digital Twin Consortium and the Industrial Digital Twin Association have developed best practices and international standards (IEC 63278-1) on key aspects of DTs. Asset-intensive industries like automotive, via Catena-X, are implementing those standards already.

Have a clear vision and roadmap: Build DT platform for the first DT Use Case, to demonstrate business value. Put the quick wins at the beginning of the roadmap. Consider building skills, organizational and process changes on the roadmap, not just the technology.

Build Digital Twins based on business needs: The capabilities of a DT, including its level of fidelity and frequency depend on the decision-making that it supports. For example, for an Asset DT, established AM techniques like FMECA can help you define this.