

BSI Standards Publication

Automation systems and integration — Digital twin framework for manufacturing

Part 5: Digital thread for digital twin



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National foreword

This British Standard is the UK implementation of ISO 23247-5:2026.

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A list of organizations represented on this committee can be obtained on request to its committee manager.

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ISO 23247-5

Automation systems and integration — Digital twin framework for manufacturing —

Part 5: Digital thread for digital twin

Systèmes d'automatisation et intégration — Cadre technique de jumeau numérique dans un contexte de fabrication —

Partie 5: Continuité numérique pour le jumeau numérique

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A list of all parts in the ISO 23247 series can be found on the ISO website.

Any feedback or questions on this document should be directed to the user's national standards body. A complete listing of these bodies can be found at www.iso.org/members.html.

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The ISO 23247 series defines a framework to support digital twins in manufacturing. A digital twin assists with detecting events in manufacturing processes to achieve functional objectives such as real-time control, predictive maintenance, in-process adaptation, big data analytics, process and manufactured component validation, and machine learning. A digital twin monitors its observable manufacturing elements by constantly updating and analysing relevant operational and environmental data as process/part changes. This visibility into process and execution enabled by a digital twin enhances manufacturing operations and business cooperation.

Manufacturing supported by implementing the ISO 23247 framework depends on the standards and technologies available to model the observable manufacturing elements. Different manufacturing domains can use different data standards. As a framework, this document does not prescribe specific data formats or communication protocols.

The subject areas of the six parts of this series are defined below:

- ISO 23247-1: General principles and requirements for developing digital twins in manufacturing;
- ISO 23247-2: Reference architecture with functional views;
- ISO 23247-3: List of basic information attributes for the observable manufacturing elements;
- ISO 23247-4: Technical requirements for information exchange between entities within the reference architecture;
- ISO 23247-5: Requirements and guidance to use digital threads for connecting manufacturing lifecycle data to digital twins;
- ISO 23247-6: Requirements and guidance for performing digital twin composition.

Figure 1 shows how the six parts of the series are related.

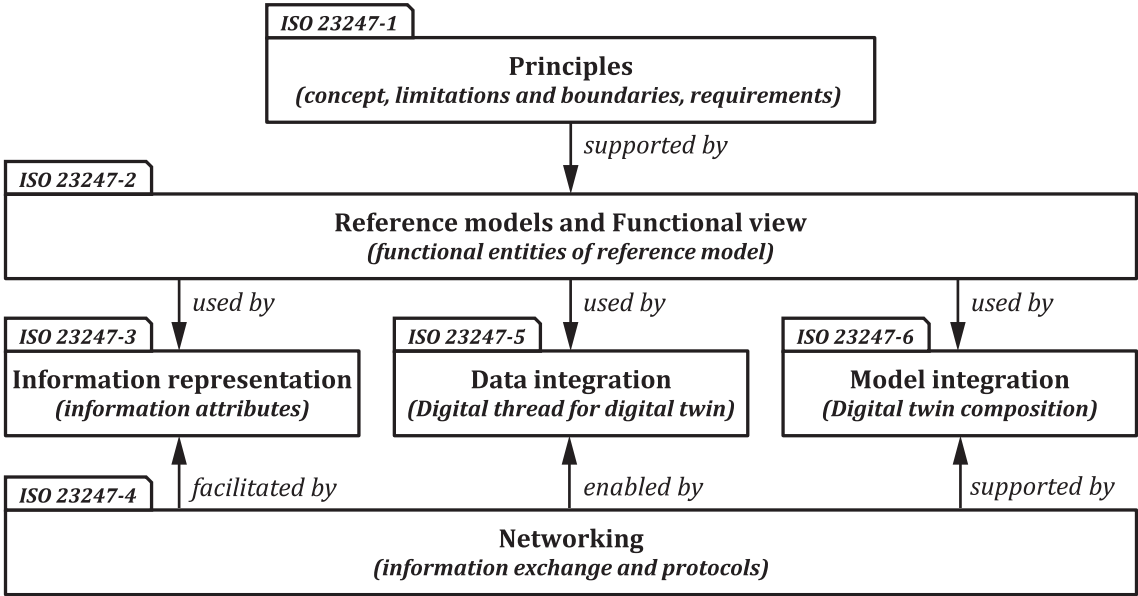


Figure 1 — ISO 23247 series relationships

This document describes how the digital thread supports the generation, implementation and transformation of digital twins in manufacturing.

In manufacturing, without digital threads, data from various stages of the product life cycle, such as design, production, quality management, and maintenance, usually remains isolated within individual digital twins.

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simulations and analyses with digital twins, as these functions depend on a continuous and integrated data flow. The absence of digital threads makes it difficult to associate various events and complicates time series analysis. The disconnection of information can cause delays or inhibitions in retrieving and processing data, leading to poor decision-making and difficulty in addressing issues as they arise.

Digital threads connect digital twins representing different aspects of the product life cycle. The scalability and adaptability of manufacturing are enhanced by digital threads that support seamless connections between digital twins for manufacturing processes across the life cycle, and production facilities across the extended enterprise.

This document defines the concept, requirements and operational characteristics of digital threads for digital twins in manufacturing.

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Automation systems and integration — Digital twin framework for manufacturing —

Part 5: Digital thread for digital twin

1 Scope

This document specifies how a digital thread enables the creation, connectivity, management, and maintenance of manufacturing digital twins across the product life cycle, including design, planning, production, and testing by defining principles, presenting methodologies, and providing use case examples.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 23247-2, *Automation systems and integration — Digital twin framework for manufacturing — Part 2: Reference architecture*

3 Terms and definitions

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp>
- IEC Electropedia: available at <https://www.electropedia.org/>

3.1 digital thread

digital thread for digital twins

bidirectional, dependable and trustworthy information that links digital twins with multiple data dimensions, including structure, behaviour, space, time, and lifecycle stages

Note 1 to entry: The linked digital twins can model design requirements, product models, manufacturing processes, inspection results and verification data.

Note 2 to entry: This definition was derived from a definition developed by the Digital Twin Consortium.

3.2 digital thread entity

component that manages the *digital thread for digital twins* (3.1)

3.3 digital thread link

<digital twin> reference or pointer that connects one digital twin to another with *digital thread metadata* (3.6) to establish a relationship

Note 1 to entry: Depending on performance constraints, a *digital thread link* (3.3) can connect digital twins using data structure, URL, Universally Unique Identifier (UUID), DB query or other mechanisms.