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Building Information Modelling (BIM) - Digital twins applied to the built environment - Concept and definitions

EESTI STANDARDI EESSÕNA

NATIONAL FOREWORD

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English Version

Building Information Modelling (BIM) - Digital twins applied to the built environment - Concept and definitions

Modélisation des informations de la construction (BIM)
- Jumeaux numériques en environnement bâti -
Concept et définitions

Building information modelling - Digitale Zwillinge in
der bebauten Umwelt - Struktur und Definitionen

This European Standard was approved by CEN on 12 January 2026.

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This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

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EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

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European foreword

This document (EN 18162:2026) has been prepared by Technical Committee CEN/TC 442 “Building Information Modelling (BIM)”, the secretariat of which is held by SN.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by September 2026, and conflicting national standards shall be withdrawn at the latest by September 2026.

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Introduction

This document defines the terminology for describing the relation between objects in the built environment sector, their digital twin (DTw) counterparts, and associated information.

In addition, this document aims at facilitating data flow within this sector, promoting the availability, sharing, and reuse of high-quality data to drive the creation of new business models and services, thus contributing to the development of data spaces. This development strives for better adherence to the FAIR principles (see Nachabe et al. [5] for more information), which means that information and services related to buildings and civil engineering works and their digital twins should be easily findable, accessible, interoperable, and reusable.

Moreover, the Web of Data initiative led by the World Wide Web Consortium (W3C) has developed a set of authoritative standards for semantic interoperability. These standards enable the representation, exchange, querying, reasoning and validation of knowledge based on graph-oriented data models which can be relevant for DTw. Resource Description Framework (RDF) vocabularies, Simple Knowledge Organization System (SKOS) taxonomies and Web Ontology Language (OWL) ontologies help define and organize the important concepts of a domain, as well as the relationships that can exist between objects in that domain.

The use of standard vocabularies for metadata is already ubiquitous on the web, and the use of ontologies to structure data are becoming increasingly important, notably via the Linked Open Data initiative. Semantic interoperability of data and services on data spaces is favoured by a widespread use of ontologies.

As point of start, it is inherent to any digitalisation of a real asset in the built environment, that two main types of information are faced:

- contextual data sets, behaving as static data with minor changes across the lifetime of the real asset;
- dynamic data sets, behaving as fast-moving data series in short intervals of time, approaching towards near-real-time rates.

From the contextual data sets, two main subtypes are considered: structured and unstructured data.

From the dynamic data sets, another two main subtypes are considered: real and synthetic data.

Figure 1 represents these relations between the types and subtypes of data.

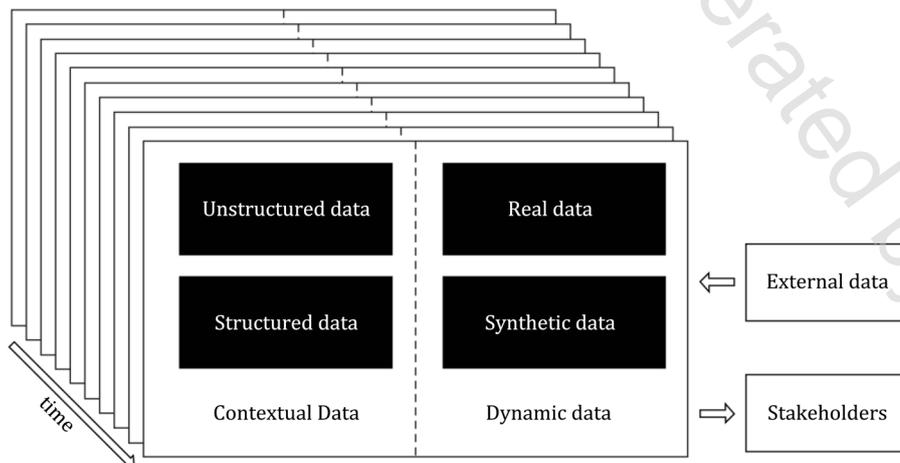


Figure 1 — Representation of the main types and subtypes of data

Considering that a digital twin:

- a) represents a virtual system that contains all relevant information about the target entity for the DTw's specific uses; and
- b) is not a static representation due to its synchronization with its target entity over time;

it can thus include both types of data sets (contextual and dynamic), as well as a method to track the evolution of the real asset over time.

In addition, to be able to connect stakeholders with all these data sets, an information and communication technology (ICT) digital twin system or environment is needed as an integrated, multi-domain physics application space to operate them. As it happens to be in any digital twin environment or system, these two basic drivers can include completely different requests depending on which is the role of the stakeholder interacting and the typology of the digital twin. However, two main overarching purposes can be described, as described in [6]:

Interrogative: The data sets can be consulted for the current and past histories. Individual digital twin can be interrogated for their current system state. Multiple aggregation of digital twin data sets would provide data that would be correlated for predicting future states.

Predictive: The digital twin would be used for predicting future behaviour and performance of the target entity. That also includes simulation of alternative configurations or hypothetical scenarios. Before reaching a mature stage, the prediction would be of the behaviour of the designed asset with components that vary between its high and low tolerances in order to ascertain that the as-designed product met the proposed requirements. Once the asset is built, the predictive performance would be based on current point in the product's lifecycle at its current state and move forward.

1 Scope

This document defines the concepts and definitions and is the first part of a set of standards to define the framework for digital twins in the built environment. It includes the terms and definitions, the relation with building information modelling and addresses the lack of standards for the qualitative specification of a digital twin, which can include geometric, attributive, structural and infrastructural quality, as applicable.

This document is based on the experiences obtained in use cases [1] and documents from other technical committees, including ISO/IEC 30173.

This document can be used in the development of other standards and in support of communications among diverse, interested parties or stakeholders. This initiative aims to define an ecosystem of digital twins opening the opportunity to release even greater value, using data for the public good.

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/IEC 30173:2023, *Digital twin — Concepts and terminology*

ISO 6707-1, *Buildings and civil engineering works — Vocabulary — Part 1: General terms*

3 Terms and definitions

For the purposes of this document the terms and definitions within ISO/IEC 30173, ISO 6707-1 and the following apply.

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

asset

item, thing or entity that has potential or actual value to an organization

Note 1 to entry: It refers to independent units of the built environment (e.g. a building like a house or an hospital, an infrastructure like a bridge or a road).

[SOURCE: ISO 55000:2014, 3.2.1, modified — The notes to entry have been removed and a new Note 1 to entry has been added.]

3.2

asset digital twin

ADTw

digital twin (3.5) of an *asset* (3.1)

3.3

common data environment

CDE

agreed source of information for any given project or *asset* (3.1), for collecting, managing and disseminating each information container through a managed process