SLOVENSKI STANDARD
SIST-TP CEN/TR 18093:2024

01-november-2024

Okvir in implementacija rešitev skupnega podatkovnega okolja, v skladu z EN ISO 19650

Framework and Implementation of Common Data Environment Solutions, in accordance with EN ISO 19650

Rahmenbedingungen und Umsetzungen gemeinsamer Datenumgebungslösungen nach EN ISO 19650

Cadre et mise en œuvre de solutions et flux de travaux pour un environnement de données commun (CDE) conformément à l'EN ISO 19650

Ta slovenski standard je istoveten z: **CEN/TR 18093:2024**

ICS:

35.240.67	Uporabniške rešitve IT v gradbeništvu	IT applications in building and construction industry
91.010.01	Gradbeništvo na splošno	Construction industry in general

SIST-TP CEN/TR 18093:2024 **en,fr,de**

TECHNICAL REPORT

RAPPORT TECHNIQUE

TECHNISCHER REPORT

CEN/TR 18093

September 2024

ICS 35.240.67; 91.010.01

English Version

Framework and Implementation of Common Data Environment solutions and workflow, in accordance with EN ISO 19650

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This Technical Report was approved by CEN on 19 August 2024. It has been drawn up by the Technical Committee CEN/TC 442.

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CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. CEN/TR 18093:2024 E

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European foreword

This document (CEN/TR 18093:2024) has been prepared by Technical Committee CEN/TC 442 “Building Information Modelling (BIM)”, the secretariat of which is held by SN.

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Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

Introduction

About the normative landscape:

EN ISO 19650 is the framework on collaborative Information Management in BIM. Its first parts were published in the end of 2018.

To enable the market CEN/TC 442 is delivering various standards and guidelines on some of the concepts introduced by the EN ISO 19650 series (e. g. EN ISO 7817-1 “Level of Information Need”, CEN/TR 17741 “Guidance to Information Delivery Manual IDM (based on EN ISO 29481), CEN/TR 17654 “Guidance to EIR/BEP” - cf. Bibliography).

The UK BIM Framework serves as another example on how to enable its market. It is a collaborative effort from British Standards Institution and NIMA (formerly the UK BIM Alliance) providing guidance on implementation of the EN ISO 19650 series and on the transition from previous national BIM standards.

This document covers the concept of the “Common Data Environment solution and workflow (CDE)” to support collaborative Information Management in BIM.

Preliminary work to explain what a CDE is and how it can be implemented has previously been done by a national initiative within the German mirror committee of CEN/TC 442 in DIN. The result was published in March 2019 as DIN SPEC PAS 91391 “CDE”.

This document is accompanied by a work item on “Open Application Programming Interface (API)” defining a technical interface for a CDE. This work is launched in parallel in CEN/TC 442/WG 2.

Enabling market:

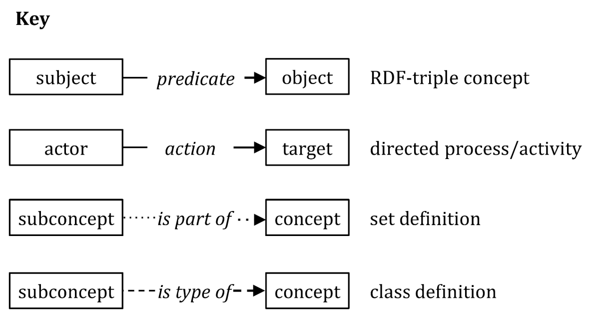
The EN ISO 19650 series of standards requires implementers to have at least a base level of understanding of concepts and options and on how to apply the processes in practice. Market participants applying and engaging in information management with BIM according to EN ISO 19650 therefore face a range of approaches. The CDE component is particularly challenging as it is often falsely only considered to be a technology requirement rather than consistent work process obligation. They can have the option to manage workflow or include integration of application programming interfaces (API) to various CDE solutions. Exchanging information containers (cf. EN ISO 19650-1:2018, 3.3.12) and exercising process management will need a suitable metadata concept. Avoiding inconsistency of deployment from project to project, from asset to asset requires a functionally sound CDE already at the start of the project. This document will provide guidance for users. The work item on CDE Open API will provide further details on how to implement respective interfaces in a CDE solution.

Understanding semantics:

The EN ISO 19650 series provides and defines a collection of new terms, concepts and principles (cf. part 1). At the same time, it also provides rules, requirements and conditions attached to them. The present Technical Report illustrates the semantics of these elements in a stringent way using a combined schema notation. The semantic schemata used in this document combine (see figure 1 and figure 2):

— a class diagram according to UML to visualize the entity relationships with (dotted lines),

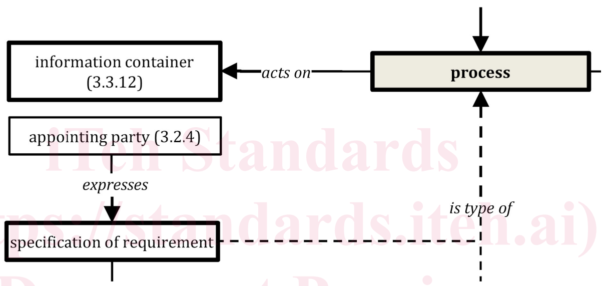
— a triple graph according to RDF to visualize the process interdependencies (full lines) - while actor-action-artefact/target can be seen as an specific example of subject-predicate-object.



Key

— *predicate* →	RDF triple concepts are composed of full lines with the predicate on the line
— *action* →	Directed process/activity
······*is part of* ··►	"is part of" relations set definitions
----*is type of*-→	"is type of" relations class definitions

Figure 1 — Key to the combined semantic schema



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— *action* →	Directed process/activity
······*is part of* ··►	"is part of" relations set definitions
----*is type of*-→	"is type of" relations class definitions
(3.3.12)	References to EN ISO 19650-1:2018 are given by the clause number in "normal" brackets.
[3.3.12]	References to EN ISO 19650-4:2022 are given by the clause number in squared brackets.

Figure 2 — Example of a combined semantic schema visualizing entity relationship (is type of) and activity triple (subject-predicate-object/actor-action-artifact, e.g. "party expresses specification")

The combination of part of/type of relations with process semantics provides a more holistic view. This view suits better to understand the combination of information entities and processes managed by the workflow of CDE.

Workflow concept in the CDE concept:

Workflow is a term being used in the title of clause 12 in EN ISO 19650-1:2018, but it is only superficially defined within EN ISO 19650 series. There are several ISO based definitions for workflow specific for and within the environment in which they are being used. Generalizing them results in the following: Workflow is the main concept hosting processes (see figure 3). Processes are being made up by activities (reference ISO 12651-2 and EN ISO 9000:2015, 3.4.1). In a way an activity as the basic element of workflow can be compared with an information container being the basic element of information management.

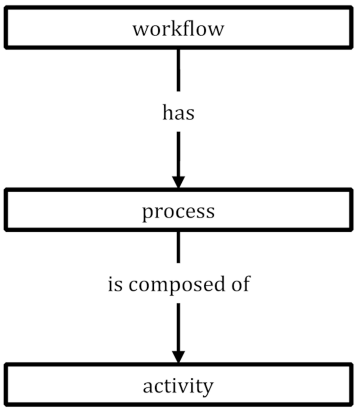

Figure 3 — Workflow as a combination of processes composed by activities

Entity concept in terms of CDE:

Entity management in a CDE explained here uses the concept of information container (EN ISO 19650-1:2018, 3.3.12). It is slightly different to the entity concept used in EN ISO 16739-1. The entity concept in EN ISO 16739-1 is embedded in an object-orientated environment (model language of ISO 10303-11:2004). The entity concept in EN ISO 19650 series rather uses entity as a static concept in contrast to the dynamic concept of a process. Information container used in ISO 19650 and this document can be understood as a type of an entity in the general semantic meaning of entity.

1 Scope

This document summarizes and explains the concept of “CDE solution and workflow” - hereby abbreviated by ”CDE”. The concept of CDE is primarily defined but not extensively explained in EN ISO 19650 series. Due to the very nature of the EN ISO 19650 series the standardized definition and usage of CDE described in the very series can be too abstract for direct implementation. By explaining the CDE concept in more detail this document will also serve as an implementation guidance.

Doing so this document will detail the following concepts introduced by EN ISO 19650:

— workflow as a collaborative process of managing the information and information containers,

— solutions to support the management and project processes inherent for BIM.

Archiving and versioning of information containers can become very complex when considering various typical information situations of a project. Further elements, rules and terminology for information management and digitisation needs to be explained and technically framed in the context of a CDE. In particular this document describes:

— the framework established by the concepts in and around the CDE concept of EN ISO 19650,

— the relation between workflow and solution by differentiating between process and entity management using the layer concept and

— the connection between workflow and solution by using Information Delivery Plans (MIDP and TIDP in ISO 19650).

This document enables thereby the market participant and CDE user on:

— how to manage processes in collaborative information management according to EN ISO 19650,

— how to manage entities (e.g. Information Containers like models, requirements, container states),

— how to maintain and manage “living documents” like Information Models (AIM, PIM) and

— how to maintain, exchange and manage Information Requirements like (OIR, AIR, EIR) as well as BIM Execution Plans (BEP).

This document identifies the range of important terms related to the CDE concept and associated relationships to relevant normative references.

This document is accompanied by a parallel work item within CEN/TC 442 defining Application Programming Interface for the information management interfacing between various CDE and CDE solutions. This European standard (under development) named “Open API for CDE” is being developed within a Joint Task group of CEN/TC 442/WG2 and CEN/TC 442/WG 3.

2 Normative references

There are no normative references in this document.

3 Terms, definitions and abbreviations

3.1 Terms and definitions

For the purposes of this document, the following terms and definitions 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/

3.1.1
activity
<context>
actor-action-artifact triple

[SOURCE: RDF W3C - w3.org/TR/PR-rdf-syntax, WfMC - wfmc.org]

3.1.2
activity
<W3C context>
description of a piece of work that forms one logical step within a process

Note 1 to entry: Activity is the basic unit of work within a process. Presumably work can be subdivided into units - smaller than a given activity, but it is not meaningful for the organization to track work down to that level of detail.

Note 2 to entry: Synonyms of activity are node, step, and task.

[SOURCE: ACM - Adaptive Case Management, Swenson, Keith D. (2010), modified]

3.1.3
action
verbal noun (gerund) relating to the predicate in the subject-predicate-object triple of an activity

[SOURCE: WfMC - wfmc.org]

3.1.4
actor
person, organization or organizational unit involved in a construction process

[SOURCE: EN ISO 19650-1:2018, definition 3.2.1]

3.1.5
artifact
work item as target of an action in an activity

[SOURCE: WfMC - wfmc.org]

3.1.6
process
< Workflow Managment Coaltion (WfMC) - wfmc.org context>
set of one or more linked activities that realize an objective or policy goal, normally within the context of an organizational structure defining functions and relationships

Note 1 to entry: A process consists of activities.

[SOURCE: ACM - Adaptive Case Management, Swenson, Keith D. (2010), modified]

3.1.7
process
< Workflow Managment Coaltion (WfMC) - wfmc.org context>
set of activities

[SOURCE: WfMC - wfmc.org]

3.1.8
process instance
data structure that represents a particular instance of running of a process

Note 1 to entry: A process instance has associated context information that can be used and manipulated by the process.

Note 2 to entry: A process instance plays a role in a business process management system (BPMS) that is very similar but not exactly the same as a case in a case management system. A particular case can have more than one process instance associated with it.

[SOURCE: ACM - Adaptive Case Management, Swenson, Keith D. (2010)]

3.1.9
workflow
< Workflow Managment Coaltion (WfMC) - wfmc.org context>
logical and sequential schema allowing to design, execute, monitor, change and optimise one or more processes in its logical sequence in combination with CDE functions

Note 1 to entry: A CDE workflow can be part of a business case like information technology, roles and projects.

Note 2 to entry: Synonyms include process definition.

EXAMPLE: A CDE workflow can describe the passing of documents, information or tasks from one participant to another according to a given set of procedural rules.

[SOURCE: WfMC - wfmc.org, modified]

3.1.10
workflow
< Workflow Managment Coaltion (WfMC) - wfmc.org context>
automation of a process, in whole or part during which documents, information or tasks are passed from one participant to another for action according to a set of procedural rules

Note 1 to entry: Synonyms include process definition.

[SOURCE: ACM - Adaptive Case Management, Swenson, Keith D. (2010), modified]

3.2 Abbreviations

A list of abbreviated terms is given in table 1.

Table 1 — abbreviated terms

abbreviation	source	URI
WfMC	Workflow Management Coalition	wfmc.org
ACM	Adaptive Case Management	Mastering the Unpredictable: How Adaptive Case Management Will Revolutionize the Way That Knowledge Workers Get Things Done, Swenson, Keith D. (2010)
RDF W3C	Resource Description Framework	w3.org/TR/PR-rdf-syntax

4 Information management according to EN ISO 19650

4.1 Information management in the normative environment

This document is rooted in the EN ISO 19650 series. Clauses 11 and 12 of EN ISO 19650-1:2018 introduce the concept of “Common Data Environment - solution and workflow (CDE)” as an indispensable component of information management according to the EN ISO 19650 series. The following schema (see figure 4) lists more concepts of information management introduced with EN ISO 19650 series. Along the dotted line the normative references and relations are given as quoted within EN ISO 19650-1:2018.