Digital Competences & Digital Twins: Towards an European Consensus?

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University of Brescia & CEN TC 442

CEN TC 442 WG 8

CEN TC 442 BIM

WG 8 Competence

PWI CEN/TS

Professions and competences related to the Information Management

From a Standard to a Technical Specification

CEN TC 442 WG 8

CEN/TC 442/WG 8

CEN / TC442 / WG8
Work Update

Report from Mark Baldwin, Lucie Svamberkova, Angelo Ciribini

28th of February 2024

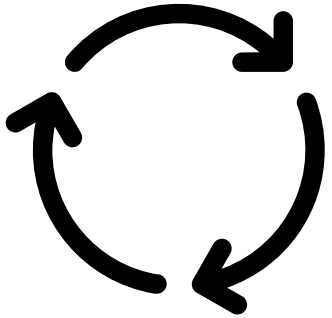
Status Report

CEN TC 442 WG 8

CEN TC 442 BIM

WG 8 Competence

Convenor: Angelo Luigi Camillo Ciribini, UNI



CEN TC 442 BIM

WG 9 Digital Twins in Built Environment

Convenor: Eduard Loscos, AENOR

CEN TC 442 WG 8

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Worgroup Timeline

2021	2022											
Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
WG8 Kick-Off	Presentations from exisitng "Digital Competence" initiatives					Define WG focus, goals and outputs/ Development of WG8 "Position Paper"						

2023												2024
Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan
Publication of document CEN-TC 442-WG 8_N69_Work Group Initial Position					Proposal for New Work Item (N685) Technical Specifcation				Workshops to develop the WI Technical Specification (with Competency Framework)			

20 Meetings Workshops already held 3 (2021-2024)

BDTA BUILDING DIGITAL TWIN ASSOCIATION

CEN TC 442 WG 8

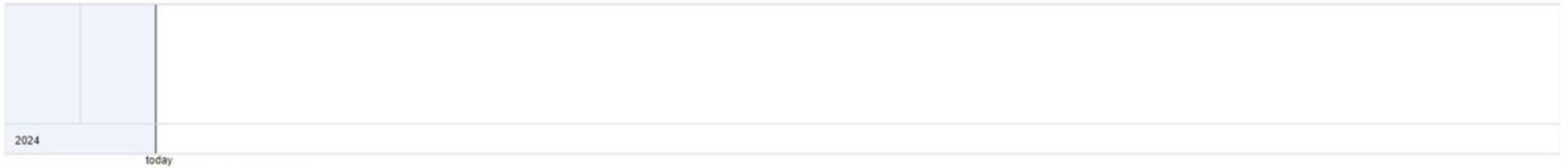
00442054

Professions and competences related to the Information Management

Responsible:	CEN/TC 442	*Drafting:*	CEN/TC 442/WG 8	*Project Leader:*	-
WI/Standard status:	Waiting/Not Published	*Track:*	TS/TCA		
Category:	Main	*Parallel:*	No		

WI Plan (Milestones) | WI Plan (All) | Title/Scope | Legislation | WI relations | Decisions | Classifications | Remarks | Released Documents | Technical Body | Timeline | TCs of interest

Timeline:



Note: Move your mouse over the milestones for more details

Phase	Event (Milestones)	Stage-Code	Initial plan	Realized	Adjusted plan
Proposal and decision on WI	Proposal of Preliminary WI	00.60.0000		2024-01-16	2024-01-16
	Proposal of WI for approval	10.00.0000			
	Decision on WI Proposal	10.99.0000			2024-12-31
Drafting of 1st working doc	Circulation of 1st WD	20.60.0979			2025-06-30
Consensus and consolidation	Acceptance of TS draft	30.99.0979			2025-12-30
Vote on TS	Submission to Vote on TS	50.20.0000			2026-04-17
	Closure of Vote on TS	50.60.0000			2026-07-10
Finalization of standard	DOR/Ratification	60.55.0000			2026-08-10
	DAV/Definitive text available	60.60.0000			2026-10-12
Publication	DOA/Announcement	65.31.0000			2027-01-12
	Completion all nat. publ. (M)	65.51.0000			
Review	Start of review	90.00.0000			2029-10-12
	Decision on results of review	90.93.0000			
Review Vote	Submission to Review Vote	90.20.0000			
	Closure of Review Vote	90.60.0000			

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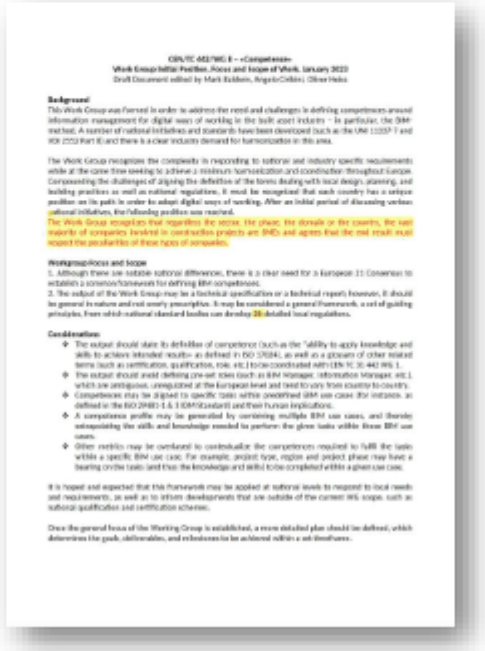
Position Paper (Q1 2023)

Focus and Scope

- Recognition of national differences, as well as a need for **European consensus** for defining BIM/digital competences.
- The first output of WG8 will be a technical specification that seeks to provide a **generally applicable framework** (non-prescriptive).
- It is hoped this will form a **basis** from which **national standard bodies** can develop local regulations.



CEN/TC 442/WG 8 – «Competences»
Work Group Initial Position, Focus and Scope of Work, January 2023
Draft Document edited by Mark Baldwin, Angelo Cefalo, Oliver Heiss

Background

This Work Group was formed in order to address the need and challenges in defining competences around information management for digital ways of working in the built asset industry – in particular, the BIM method. A number of national initiatives and standards have been developed (such as the UNI 11337 7 and PDF 2019 Part 8) and there is a clear industry demand for harmonization in this area.

The Work Group recognizes the complexity in responding to national and industry specific requirements while at the same time seeking to achieve a minimum harmonization and coordination throughout Europe. Compounding the challenges of aligning the definition of the terms dealing with local design, planning, and building practices as well as national regulations, it must be recognized that each country has a unique position on its path in order to adopt digital ways of working. After an initial period of discussing various national initiatives, the following position was reached.

The Work Group recognizes that regardless the sector, the phase, the domain or the country, the vast majority of companies involved in construction projects are SMEs and agrees that the end result must respect the peculiarities of these types of companies.

Workgroup Focus and Scope

1. Although there are notable national differences, there is a clear need for a European (!) Consensus to establish a common framework for defining BIM competences.
2. The output of the Work Group may be a technical specification or a technical report; however, it should be general in nature and not overly prescriptive. It may be considered a general framework, a set of guiding principles, from which national standard bodies can develop [?] detailed local regulations.

Considerations

- The output should state its definition of competence (such as the "ability to apply knowledge and skills to achieve intended results» as defined in ISO 17024), as well as a glossary of other related terms (such as certification, qualification, role, etc.) to be coordinated with CEN TC 31-442 WG 1.
- The output should avoid defining pre-set roles (such as BIM Manager, Information Manager, etc.), which are ambiguous, unregulated at the European level and tend to vary from country to country.
- Competences may be aligned to specific tasks within predefined BIM use cases (for instance, as defined in the ISO 29481-1 & 2 BIM Standard) and their human implications.
- A competence profile may be generated by combining multiple BIM use cases, and thereby extrapolating the skills and knowledge needed to perform the given tasks within those BIM use cases.
- Other metrics may be developed to contextualize the competences required to fulfill the tasks within a specific BIM use case. For example, project type, region and project phase may have a bearing on the tasks (and thus the knowledge and skills) to be completed within a given use case.

It is hoped and expected that this framework may be applied at national levels to respond to local needs and requirements, as well as to inform developments that are outside of the current WG scope, such as national qualification and certification schemes.

Once the general focus of the Working Group is established, a more detailed plan should be defined, which determines the goals, deliverables, and milestones to be achieved within a set timeframe.

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TS Document Structure

- Introduction
- Scope
- Normative References
- Terms & Definitions
- European Foreword
- Framework Standards
  - (eg ISO 17024 ISO 19650 Series
- Existing Competence Initiatives
  - (focus on standards)
- Evaluation of Existing Competence Initiatives
- Competence Framework
- Implementation Guidelines

- **Annexes**
- Country Conversion Table for Roles and Functions
- State of BIM in various countries (incl. existing competency initiatives)

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ISO/IEC 30173:2023

Digital twin - Concepts and terminology

CEN NWI Digital Twins - Concept and definitions

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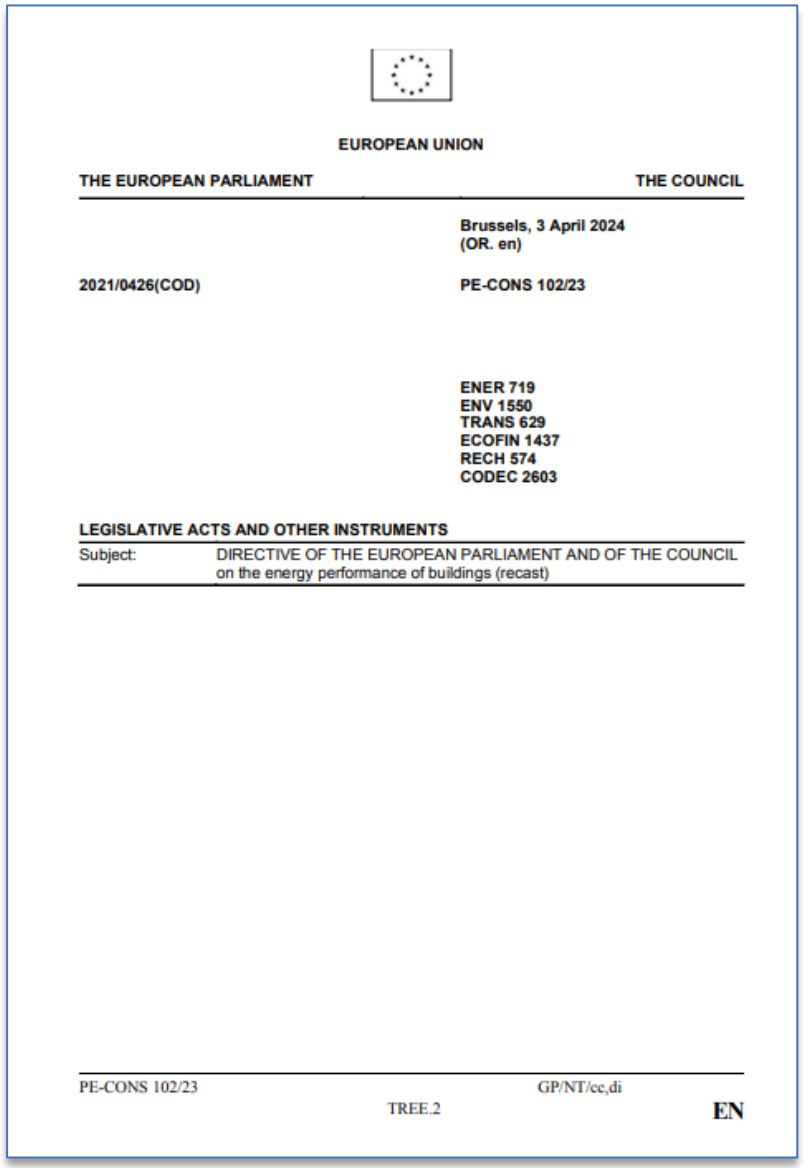

EUROPEAN UNION

THE EUROPEAN PARLIAMENT — THE COUNCIL

Brussels, 3 April 2024
(OR. en)

2021/0426(COD) — PE-CONS 102/23

ENER 719
ENV 1550
TRANS 629
ECOFIN 1437
RECH 574
CODEC 2603

LEGISLATIVE ACTS AND OTHER INSTRUMENTS

Subject: DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the energy performance of buildings (recast)

PE-CONS 102/23 GP/NT/cc,di
TREE.2 EN

(56) The smart readiness indicator should be used to measure the capacity of buildings to use information and communication technologies and electronic systems to adapt the operation of buildings to the needs of the occupants and the grid and to improve the energy efficiency and overall performance of buildings. The smart readiness indicator should raise awareness among building owners and occupants of the value behind building automation and electronic monitoring of technical building systems and should give confidence to occupants about the actual savings of those new enhanced-functionalities. The smart readiness indicator is particularly beneficial for large buildings with a high energy demand. For other buildings, the scheme for rating the smart readiness of buildings should be optional for Member States.

(57) A digital building twin is an interactive and dynamic simulation that reflects the real-time status and behaviour of a physical building. By incorporating real-time data from sensors, smart meters and other sources, a digital building twin provides a holistic view of the building's performance, including energy consumption, temperature, humidity, occupancy levels, and more and can be used to monitor and manage the building's energy consumption. Where a digital building twin is available, it should be taken into account, in particular for the smart readiness indicator.

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UNI 11337-7:2018 Standard

Law 4 /2013

Non Chartered Practictioners

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BIM Specialist

BIM Manager

BIM Coordinator

CDE Manager

GEOBIM Specialist?

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Education

Training

Qualification

Certification

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We are not specifying any Professional Role at the European Level

We could reach a consensus about the Digital Competences

We might define the Competences dealing with the DTw Management

3.1.1

digital twin

DTw

digital representation (3.1.8) of a *target entity* (3.1.3) with data connections that enable convergence between the physical and digital states at an appropriate rate of synchronization

3.1.5

digital entity

computational entity comprising data elements and procedural elements

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3.1.9

modelling

using symbolic paradigms or formal languages to create an abstract representation of a thing

3.3.3

information model

model of a set of facts, concepts or instructions to meet a specific requirement

[SOURCE: ISO 6707-2:2017, 3.2.35]

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Semantics

Semiotics

Ontologies

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Synchronization

Sensing

Actuating

Simulation

Prediction

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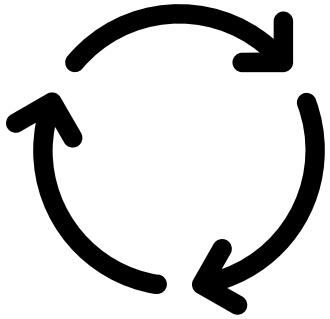

Geo-Spatial Modeling

Building Information Modeling

Digital Twinning

Large Language Modeling (including RAG)

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DT (or DTw?) Manager?

as a

Prompt Designer & Engineer?

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On Real Time (On Remote?) Decision-Making Process

Modifying the Behaviour of a Target Entity

Causal Explanations & Algorithmic Decision Making Process

Human-In-the-Loop or On-the-Loop?

BDTIC

4CH BUILDING DIGITAL TWIN International Congress

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