



ICOM
international
committee
for documentation

The CIDOC CRM Version 7

***Presentation of progress since
version 5.0.4 (ISO21127:2014)***

Martin Dörr

Chair, CIDOC CRM Special Interest Group

**Heraklion, Crete, Greece,
March 8, 2021**

The New Official Version

- Dec 2011: We published the **last official** version, 5.0.4, and submitted to ISO as new community draft for revision of ISO21127
- Oct 2013: Version 5.1.2 imported spacetime concept from CRMgeo.
- 2014: Version 5.0.4 became **ISO21127:2014**, with minor deviations.
- Jan 2015: Changing major version number to 6.0 because of spacetime logic and importing deviations from ISO21127:2014
- Oct 2015 **Last published** version 6.2.1, concept of “presence” refined, **FOL** introduced: theoretical foundations.
- 2018-2019 Guidelines for **RDF** Implementation. Systematic **quality control** in all aspects. **Consolidating** modeling the spatiotemporal extent of periods and things.
- June 2020 Version 7.0, base for new official version. Continuing quality control
- March 2021 **Official release 7.1** intended prototype for **revision of ISO21127**

Major Achievements since 5.0.4

Much more “daring” than before, focus on semantic principles, expressive power, logical consistency and editorial quality.

Some “experimental” constructs had to be abandoned in the process, but the overall result is of superior quality and consistency.

Therefore, a much longer development cycle. In 2019 - 2020, high priority on consolidation.

Highlights:

- Introduction revised and extended
 - Compact description of the **major theoretical underpinnings** of the CIDOC CRM, in terms of scope, function, relation to reality, extensibility, relationship of ontologies, **knowledge bases** and their maintainers.
 - New: **didactic introduction** to the basic concepts, including a **real example** from history or art.
 - Explanation of the new temporal topological relation primitives.

Major Achievements since 5.0.4

- Spatiotemporal model:
 - In 5.0.4, people and things become *manifest in spacetime* only by presence *in events*. No concept of their whereabouts *in between*. “Former or current locations”. No explicit *extensional theory* of events and objects.
 - *CRMgeo* solved in 2013 the integration of *GIS standards* with the CIDOC CRM by introducing new concepts, extents in *spacetime* and *phenomenal versus declarative* extents, an epistemology of locating things.
 - *Version 7.1* imported, simplified and improved *core concepts of CRMgeo*, a sort of (unique?) *foundational theory* with focus on *constraining the past* in its intrinsic *indeterminacy*.
 - Introducing *extents in spacetime*, allows for constraining the *whereabouts* of items for *all their existence* and for describing *presence* and *containment* at specific time-spans *without* specific *events*, as frequent in historical narratives...

Major Achievements since 5.0.4

- Spatiotemporal model cont'ed:
 - It is *scientifically correct*, not naïve. Enables an *explicit extensional theory* of periods, events and objects *in FOL*. Complete set of FOL axioms still under development.
 - It yields correct, consistent and *intuitive inferences* about *whereabouts*, *participation* and spatial *containment*.
 - The base concept, the “Spacetime Volume”, is *4D*, not intuitive for untrained people, more a *subconscious* concept with conscious *intuitive inferences*.
 - A *didactic challenge*, but needs not be used explicitly in most applications and can therefore be *skipped over*.
- New temporal topological primitives
 - Replace Allen's, which are not adequate for inferences between temporal and causal constraints based on existence, presence, parthood etc.
 - Defining *fuzzy* boundaries *without fuzzy functions* (logic of *constraints*).

Major Achievements since 5.0.4

- Logic of Primitive values:
 - Symmetry of *inner/outer bounds* between *E53 Place* and *E52 Time-Span*,
 - *Declarative* places and times,
 - Primitive values as *appellations*
 - Strings and *symbolic content*.
- “Cleaning” subclasses of E41 Appellation of limited utility.
- FOL axioms for all classes and properties (to be extended)
- Great editorial improvements
 - *Uniform formats and style templates throughout the document*
 - *References for many real-life examples*
 - *Typos, referential integrity*

Let us make a walk through the document now!

Editorial changes since 7.0.1

CIDOC CRM v7.0.1 was published on 18 October 2020, right before the 48th CIDOC CRM SIG meeting

CIDOC CRM v7.1 was released on 3 March 2021 and it incorporated changes decided at the 48th SIG and changes implemented by the editorial board since then. The latter conformed to prior decisions of the SIG, and mostly involved correcting FOL representations and the quantification of properties.

DECISIONS OF THE 48th SIG MEETING (issue nrs in subscripts)

- FOL & Quantification of Properties:
 - *P170 defines time (time is defined by), FOL* [508];
 - *P5 consists of (forms part of) and P9 consists of (forms part of) and P73 has translation (is translation of), FOL & Quantification* [406];
- Scope Note Editing:
 - *P164 is temporally specified by (temporally specifies)* [507]; *P101 had as general use (was use of)* [477]; *E81 Transformation, P123 resulted in (resulted from), P124 transformed (was transformed by)* [404]; *E11 Modification* [506]; *E78 Curated Holding* [442];

Editorial changes since 7.0.1

DECISIONS OF THE 48th SIG MEETING cont'ed(issue nrs in subscripts)

- **Figures & Graphics:**
 - *“Winkelmann seeing Laocoon” as evolution in Space and Time* [505, 471];
- **Examples added/revised:**
 - *E9 Move, P26 moved to (was destination of), P27 moved from (was origin of), P174 starts before the end of (ends after the start of), P183 ends before the start of (starts after the end of), P196 defines (is defined by)* [484]
 - *E81 Transformation, P123 resulted in (resulted from), P124 transformed (was transformed by)* [404]
 - *E13 Attribute Assignment* [503]
 - *E54 Dimension* [514]
 - *E33 Linguistic Object* [500]
- **Backwards compatibility:**
 - *Migration paths from deprecated classes/properties and properties with reduced domains/ranges from the last official CIDOC CRM release (v5.0.4)* [495];

Editorial changes since 7.0.1

In order to speed up, the editorial team implemented a series of further changes. Those regarded to be **potentially contentious** are formulated **as open issues to be confirmed by the SIG**. In order to question changes **regarded as unambiguous** logical necessities by the editorial team, **new issues** should be formulated.

Decisions of the editorial team(**open** issue nrs in subscripts)

➤ FOL & Quantification of Properties:

- *P69 has association with (is associated with) (FOL axiom for symmetry deleted, FOL axiom for transitivity added); P197 covered parts of (was partially covered by) [521]*
- *P156 occupies (is spatial projection of) [**many to one (0,1:0,n)**]; P189 approximates (is approximated by) [**many to many (0,n:0,n)**]; P59 has section [**many to many (0,n:0,n)**]; P55 has current location (currently holds) [**many to many (0,n:0,n)**]; P160 has temporal projection [**many to one, necessary (1,1:0,n)**]*
- *P1 is identified by (identifies), P2 has type (is type of): **axioms for the full paths were added -shortcut descriptions were added/edited.***

Editorial changes since 7.0.1

- FOL & Quantification of Properties cont'ed:
 - *Reflexivity:*
 - *Addition of a reflexivity definition in the terminology section (introduction)*
 - *P10 falls within (contains), P89 falls within (contains): reflexive*
 - *P46 is composed of (forms part of), P106 is composed of (forms part of), P139 has alternative form: non-reflexive*
 - *Symmetry:*
 - *Addition of a symmetry definition in the terminology section (introduction)*
 - *P9 consists of (forms part of), P73 has translation (is translation of): non-symmetric [406]*
- IsA Referential Integrity
 - *P111 added (was added by) isA P16 used specific object (was used for).
“..isA P12 occurred in the presence of (was present at)” **was redundant and deleted***

Editorial changes since 7.0.1

- FOL & Quantification of Properties cont'ed:
 - *The following properties have been declared **isA P1 is identified by (identifies)** following the decision to declare E94 Space Primitive, E61 Time Primitive, E95 Spacetime Primitive isA E59 Primitive Value AND isA E41 Appellation [467]:*
 - *P168 place is defined by (defines place)*
 - *P169i spacetime volume is defined by (defines spacetime volume)*
 - *P170i time is defined by (defines time).*

- Text enhancements
 - *“Winkelmann seeing Laocoon” as evolution in Space and Time explanatory text [505,471]*
 - *Text on bias added [530]*
 - *Reviewed and updated the references in the document; run an extensive check for errata and typos [and we have missed quite a few]; All the examples were made to conform to the template [493]*

Editorial changes since 7.0.1

- Backwards Compatibility
 - *Deprecated classes and properties, and one reduction of range, create **backwards incompatibility**. For those, migration paths have been formulated:*
 - *Migration paths from deprecated classes/properties and properties with reduced domains/ranges from the last official CIDOC CRM release (v5.0.4) [495];*
 - *Migration paths to CRMarchaeo for deprecated Allen operators [282, 495];*

That's All Folks!

Particular thanks to all contributors, members expressing opinions and asking questions, and particularly the members of the editorial team!

(Everybody kindly invited to participate next time in the editorial team!)