

# 56<sup>th</sup> joint meeting of the CIDOC CRM SIG and ISO/TC46/SC4/WG9; 49<sup>th</sup> meeting of FRBR/LRMoo SIG

9-12 May 2023

Foundation for Research and Technology – Hellas (FORTH)

## Participants:

**Achille Felicetti** (PIN/University of Florence; Italy), **Alessia Vaccariello** (Sapienza Università di Roma; Italy), **Anaïs Guillem** (CNRS; France), **Athanasios Velios** (English Heritage; UK), **Athina Kritsotaki** (FORTH; Greece), **Christian-Emil Ore** (University of Oslo; Norway), **Chryssoula Bekiari** (FORTH; Greece), **Eduarne Uriarte** (UNAM-DGRU; Mexico), **Eleni Tsouloucha** (FORTH; Greece), **Elias Tzortzakakis** (FORTH; Greece), **Emilio Sanfilippo** (CNR; Italy), **Erin Canning** (University of Oxford ; UK), **Francesca Murano** (Università degli Studi di Firenze; Italy), **Francesco Beretta** (LARHRA CNRS; France), **George Bruseker** (Takin.solutions; Bulgaria), **Gerald Hiebel** (University of Innsbruck; Austria), **Maja Žumer** (Univeristy of Ljubljana; Slovenia), **Manolis Peponakis** (Ionian University & National Documentation Centre; Greece), **Mark Fichtner** (Germanisches Nationalmuseum; Germany), **Markos Katsianis** (University of Patras; Greece), **Marta Acierno** (Sapienza Università di Roma; Italy), **Martin Doerr** (FORTH; Greece), **Matthias Schlögl** (Austrian Academy of Sciences; Austria), **Mélanie Roche** (BNF ; France), **Nicola Aloia** (ISTI-CNR; Italy), **Olivier Marlet** (CNRS - Consortium Huma-Num MASApplus; France), **Pat Riva** (Concordia University Library; Canada), **Pavlos Fafalios** (FORTH; Greece), **Pedro Angeles Jiménez** (UNAM-IIE; Mexico), **Philippe Michon** (CHIN; Canada), **Pierre Choffé** (Logilab, France), **Puyu Wang** (University of Oxford; UK), **Ron Van den Branden** (Letterenhuis; Belgium), **Stephen Stead** (Paveprime Ltd; UK), **Thomas Wikman** (Delving B.V.; The Netherlands), **Trond Aalberg** (Norwegian University of Science and Technology; Norway)

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Tuesday 9 May 2023

CIDOC CRM Training Material – 56th CIDOC CRM SIG Meeting

GB gave an introductory [presentation](#) concerning the overall purpose of the day's activities. The presentation sums up the [document](#) that was circulated through the listserv and aims at redesigning the educational material around CIDOC CRM taking into account the learning needs of different kinds of audiences, and follows the modular structure proposed therein.

Following the presentation an open-ended discussion concerning each proposed module took place. A summary of the discussions and relevant decisions can be found [here](#).

Wednesday 10 May 2023

Managing the SIG's involvement in launching a new extension -a proposal by Stephen Stead  
The document that Steve drafted can be found in the [appendix](#).

**Discussion points:**

- Participants found the proposal OK.
- Launching a new CRM-compatible extension and maintaining current extensions should follow the same management model.
- **For new releases:** WGs should provide a timeline of when that's expected to happen and should also provide updates at each meeting. Progress reports needn't be extensive, but they should give an outline with respect to (i) how things stand, and (ii) what the envisaged contribution of the SIG is.
- Managing extensions and communicating interim results between meetings to be considered in a case-by-case basis –It is up to the WG developing an extension to determine what the SIG's contribution will be (set a reviewer, start an evote, present alternatives, whatnot), as long as they detail this contribution in the motivation statement (to be shared with the SIG).

The SIG voted to accept the procedure detailed in the document drafted by SdS.

**Outcome of the vote:**

In favor: 14 (11 in person, 3 online)

Against: none

(7 participants abstained)<sup>1</sup>

**Decision:** extensions managers should issue suchlike motivational statements (consisting of timelines) two weeks ahead of the meeting in October at the latest.

Issue 621: Update synchronization btw CRMarchaeo and CRMbase

CEO brought the SIG up to speed on the dependencies of CRMarchaeo with CRMbase and CRMsci and the changes that need to be implemented in CRMarchaeo.

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<sup>1</sup> The number of people who abstained from the votes is calculated from the participation forms.

*Since A1 Excavation Process Unit is a subclass of E12 Production, it is proposed that the property AP4 produced surface, is also declared a subproperty of P108 has produced.*

The SIG voted to accept the proposed change.

**Outcome of the vote:**

In favor: 9 (7 in person, 2 online)

Against: none

(12 participants abstained)

**Decision**: make *AP4 produced surface* a subproperty of *P108 has produced*

*Allen properties to be linked with temporal properties P173-P176 and P182-P185.*

It is proposed that:

- *AP22 is equal in time to* correlates with:
  - a) P175 starts before or with the start of (starts after or with the start of)
  - b) P175i starts after or with the start of (starts before or with the start of)
  - c) P184 ends before or with the end of (ends with or after the end of)
  - d) P184i ends with or after the end of (ends before or with the end of)
    - The Allen property needs to be correlated with two CRMbase temporal properties, given that the latter only mark the beginning or the final end-point of a temporal interval, where as equals in time marks two end points.
- *AP23 finishes* correlates with:
  - a) P176i starts after the start of (starts before the start of)
  - b) P184 ends before or with the end of (ends with or after the end of)
  - c) P184i ends with or after the end of (ends before or with the end of)
- *AP24 starts* correlates with:
  - a) P175 starts before or with the start of (starts after or with the start of)
  - b) P175i starts after or with the start of (starts before or with the start of)
  - c) P185 ends before the end of (ends after the end of)
- *AP25 occurs during* correlates with:
  - a) P176i starts after the start of (starts before the start of)
  - b) P185 ends before the end of (ends after the end of)
- *AP26 overlaps in time with* correlates with:
  - a) P174i ends after the start of (starts before the end of)
  - b) P176 starts before the start of (starts after the start of)
  - c) P185 ends before the end of (ends after the end of)
- *AP27 meets in time with* correlates with:
  - a) P173i ends with or after the start of (starts before or at the end of)
  - b) P182 ends before or with the start of
- *AP28 occurs before* correlates with:
  - a) P183 ends before the start of (starts after the end of)

The SIG voted to accept the proposed changes.

**Outcome of the vote:**

In favor: 8 (6 in person, 2 online)

Against: none

(13 participants abstained)

*Admitting examples for AP29 appears in, AP30 restricted to and AP31 typical for*

- **AP29 appears in**: The “Cycladic” figurine type (E55) appears in the Early Cycladic period (E4). (Sotirakopoulou 2005, 50-51)
- **AP30 is restricted to**: The “Phylakopi I” or “Ayia Irini” type (E55) [of cycladic figurines] is *restricted to* the Early Cycladic III period (E4). (Sotirakopoulou 2005, 50-51)
- **AP31 typical for**: The “violin-shaped” type (E55) [of cycladic figurines] is *typical for* the Early Cycladic I period (E4). (Sotirakopoulou 2005, 50-51)

The SIG voted to admit the examples listed above.

**Outcome of the vote:**

In favor: 9 (6 in person, 3 online)

Against: none

(12 participants abstained)

*The details of the decisions can be found in the CRMarchaeo v2.0*

(Link to document [here](#)).

**Issue closed**

Issue 622: CRMarchaeo; Introductory section update

CEO walked the SIG through the changes implemented in the introduction section of CRMarchaeo –new figures, additional chunks of text added etc. The draft text can be found in the CRMarchaeo v2.0 (Link to document [here](#)).

**Discussion points:**

- Wrt. Fig. 11:
  - a) Every instance of A7 Group Declaration Event presupposes some kind of interpretation of found objects/contexts. The underlying assumptions could be modelled somehow.  
**HW**: AG to add a comment or note to the caption of Figure 11 to illustrate the existence of underlying assumptions, as well as to allow one to identify them
  - b) **Editorial remark**: the caption is far too long to be readable. An alternative for CRMarchaeo editors is to move this chunk to the main text and replace it with a more concise text.  
**HW**: CEO, AF, GH, MK
- **Wrt. Allen Operators**: **HW** to CEO to add a clause explaining why both the forward going form and the inverse form of the temporal properties need to be listed at some cases as superproperties of the Allen Operators.

The SIG voted to admit the updated introduction in the new release of CRMarchaeo.

**Outcome of the vote:**

In favor: 9 (5 in person, 4 online)

Against: none

(12 participants abstained)

**Proposal by the CRMarchaeo editors concerning the new release:**

- proposed version number: 2.0.  
It has substantial changes in it (addition of classes/properties, differences in class/property declarations, etc.).
- proposed status assignment: “Draft”, after the text has been polished and the RDFS has been checked for errors and found OK, then that release will be assigned the status “STABLE”.

The SIG voted to label the new release of CRMarchaeo v2.0 (draft).

**Outcome of the vote:**

In favor: 12 (8 in person, 4 online)

Against: none

(9 participants abstained)

Issue 613: Inverse shortcuts [CRMbase]

CEO walked the SIG through the candidates for inverse shortcuts (i.e., shortcut properties that imply an instance of the fully-articulated path that they shortcut over):

- a) [P125](#) used object of type (was object of type used in),
- b) [P167](#) was within (includes)
- c) [P171](#) at some time within
- d) [P172](#) contains
- e) [P195](#) was a presence of (had presence)
- f) [P199](#) represents instance of type
- g) P156 occupies (is occupied by)
- h) P7 took place at (witnessed)

For **(a) through (f)**: it was suggested that they form strong shortcuts (i.e., an instance of the fully developed path implies an instance of the shortcut path, AND an instance of a shortcut path implies the instance of the fully developed path) –**details of scope note updates listed per property in the appendix.**

The SIG reviewed **declarations of the full paths that some properties appear in**, in the respective scope note definitions. Said properties are:

- a) [P89](#) falls within (contains)
- b) [P161](#) has spatial projection (is spatial projection of)
- c) [P168](#) place is defined by (defines place)
- d) [P195](#) was a presence of (had presence)

Details of the proposal listed per property in the [appendix](#).

**Discussion points:**

- **P156 and P7** form inverse shortcuts as long as the reference space remains constant. This is to be further explored in a [new issue](#). The statement found in P7, namely: “Therefore, this property implies the more fully developed path from E4 Period through *P161 has spatial projection*, E53 Place, *P89 falls within* to E53 Place, where the intermediate place is also defined in the same geometric system. Both places are defined in the same geometric reference system.” can serve as a blueprint for P156.
  - AG shared with the SIG a model on spatial relations and how it overlaps with the CRM –the document can be found [here](#). And it must be considered for issue [492](#) as well.
  - Update the templates for shortcut-fully articulated paths in the documents. See if it actually helps rather than distract readers/users. To be determined in a [new issue](#).
- HW:** TV & ETz in collaboration

The SIG voted to update the shortcut information in the new release of CRMarchaeo.

**Outcome of the vote:**

In favor: 9 (7 in person, 5 online)

Against: none

(12 participants abstained)

[NEW ISSUE]: P156 occupies & P7 took place at – inverse shortcuts.

Upon discussing issue 613, the SIG resolved to start a new issue concerning the relation of the fully articulated paths that P156 and P7 shortcut over.

**Discussion points:**

- Make sure that the definition of P156 is complete wrt. the reasoning for reference spaces.
- P156 and P7 form inverse shortcuts as long as the reference space remains constant.
- The statement found in P7, namely: “Therefore, this property implies the more fully developed path from E4 Period through *P161 has spatial projection*, E53 Place, *P89 falls within* to E53 Place, where the intermediate place is also defined in the same geometric system. Both places are defined in the same geometric reference system.” can serve as a blueprint for P156.
- AG shared with the SIG a model on spatial relations and how it overlaps with the CRM –the document can be found [here](#). And it must be considered for issue [492](#) as well.

**HW:** CEO to formulate the issue.

[NEW ISSUE]: Update the templates of the CRM (base and family models) specification documents to accommodate information relevant to shortcuts vs. fully articulated paths? Before editing the templates and the documents, the SIG editors must make sure that performing such a large-scale update on the specification documents will help readers rather than encumber them (break the texts’ unity etc.)

**HW:** TV & ETz to collaborate on using the new template to derive the rdf versions of the models.

Issue 627: Explicitly document cross-references between family models

**Decision:** Model maintainers to declare the dependencies across versions of the extension that they manage and the versions of other family models that said extensions make use of. Make sure to only reference stable versions of other CRMfamily models when they declare dependencies between them.



**CRMact:** TV

**CRMarchaeo:** CEO, GH, AF, MK

**CRMba:** ?

**CRMdig:** GB, RS, MD

**CRMgeo:** GH

**CRMinf:** PF, MD, SdS

**CRMsci:** TV, AK, MD

**CRMsoc:** GB

**CRMtex:** PF, AF, FM, MD

**FRBR/LRMoo:** PR

**PRESSoo:** ?

Issue 549: Revise TX5 Reading versus TX6 Transcription [New, stable release of CRMtex]  
AF walked the SIG through the redrafted modeling constructs. The proposed changes consist of:

- revising the scope note of [TXP7 has item](#),
- revising the scope note and example of [TXP17 has part](#),
- revising the scope note of [TXP18 read](#)
- updating the FOL statement for [TXP13 deciphered via the representation](#)
- revising the scope note and example for [TX3 Writing System](#)

Details of the proposed changes can be found in the [appendix](#)

The SIG voted to admit the proposed changes in CRMtex.

**Outcome of the vote:**

In favor: 12 (11 n person, 1 online)

Against: none

(9 participants abstained)

The new version will be released shortly after the SIG meeting, following some minor, editorial revisions. It will bear the number 2.0, as it implements major changes in the model (new properties, redrafting of existing ones, etc.)

**Issue closed**

Issue 533: How to disambiguate polysemous concepts used as ontological classes

PF & AF presented HW on disambiguating a polysemous concept such as inscription by means of teasing apart its distinct aspects (physical, symbolic, and linguistic), using a graphical example of an inscription borne by the Antikythera Mechanism.

Links for the text and the diagrams that illustrate the various aspects of inscriptions can be found [here](#).

**Discussion points:**

- Explicitly reference the method applied to tease apart the different aspects of inscriptions: identity and existence conditions analysis. Make the connection with the principles that guide one to make the distinctions mentioned in the text.  
**HW:** MD to do that.
- The text to be appended to the Principles document (as suggested in the HW)
- Concerning the deciphering of the “ΑΕΤΟΣ ΕΠΙΤΕΛΛΕΙ ΕΣΠΕΡΙΟΣ”, we should accept it as is for the moment, but AF should ask Mark Mudge of Cultural Heritage Imaging for the exact context of the imaging techniques referenced in the diagram and update it in due course.

The SIG voted whether to enhance the text drafted by AF with the slides that PF has put together.

**Outcome of the vote:**

In favor: 11 (8 in person, 3 online)

Against: none

(10 participants abstained)

**HW:**

- AF to contact Mark Mudge regarding the imaging techniques used in the deciphering of the inscription “ΑΕΤΟΣ ΕΠΙΤΕΛΛΕΙ ΕΣΠΕΡΙΟΣ”
- MD to add a paragraph in the methodology part to connect this document with the Modeling Principles document.

Issue 613: Inverse shortcuts [CRMtex]

The formulation that CEO proposed -listing the fully articulated paths that a given property may form a part of -can also be implemented for CRMtex as an editorial update.

**HW:** PF to implement for version 2.1.

Issue 627: Explicitly document cross-references between family models

TX14 Reading is declared a subclass of a CRMInf class (I1 Argumentation) that has not been admitted in a stable version of the respective model. It is an important cross-reference and it has to be logged as such.

Discussion about creating separate repositories per model extension

ETz suggested that the SIG create separate repositories per model extension, to document every decision relating to parsing the documents and deriving the rdfs. This way ad hoc decisions can be avoided in favor of best practices.

CRMsci, CRMInf, and CRMtex are very good candidates to be moved to separate repositories.

Topics that need to be addressed:

- Different consistency checks for CRMbase vs extensions: For CRMbase, each class is declared a subclass of E1 CRM Entity. This is not necessarily the case for extensions.
- No explicit mention of the existence of classes that have an equivalent scope to E59 Primitive Value in CRM extensions. ETz should know that to correctly parse family models.

The repository for CRMbase is in [gitlab](#) and a link points to it from the “more” button on the resources table of stable versions. Maybe it should be made more prominent on the site.

## Issue 510: belief adoption

MD presented HW: a proposal to

- deprecate I8 Conviction, resulting in:
  - i. the declaration of I2 Belief a direct subclass of E2 Temporal Entity,
  - ii. changing the range class of J2 concluded that to I2 Belief.
  - iii. the deprecation of J11 used manifestation [D: **I8 Conviction**, R: F3 Manifestation]
  - iv. the deprecation of J12 used [D: **I8 Conviction**, R: F5 Item]
- deprecate I9 Provenanced Comprehension, resulting in the deprecation of:
  - i. J8 understands (is understood by)
  - ii. J9 believes in provenance
  - iii. J10 reads
- update the modelling around **I7 Belief Adoption**, by means of:
  - i. introducing class: Ix4 Adopted Belief
  - ii. deprecating J6 adopted [D: I7 Belief Adoption, R: I2 Belief]
  - iii. introducing property: Jxx5 adopted interpretation [D: I7 Belief Adoption, R: Ix4 Adopted Belief]
  - iv. introducing property Jxx2 adopted interpretation of [D: Ix4 Adopted Belief, E73 Information Object]
  - v. introducing class: **Ix2 Intended Meaning Belief**
  - vi. introducing property Jxx3 assumed meaning [D: I7 Belief Adoption, R: Ix2 Intended Meaning Belief]
  - vii. introducing property Jxx6 assumed meaning [D: Ix2 Intended Meaning Belief, I4 Proposition Set]
  - viii. introducing property Jxx7 about [D: Ix2 Intended Meaning, R; E73 Information Object]
  - ix. introducing class: **Ix5 Provenance Belief**
  - x. introducing property Jxx4 assumed provenance [D: I7 Belief Adoption, R: Ix5 Provenance Belief]
  - xi. introducing property Jxx8 that [D: Ix5 Provenance Belief, R: I10 Provenance Statement]
  - xii. redrafting the scope note of **I10 Provenance Statement**
  - xiii. introducing property Jxx9 is about the provenance of [D: I10 Provenance Statement, R: E70 Thing]
  - xiv. introducing class: **Ix3 Provenance Assessment**
  - xv. introducing property Jxx1 concluded provenance [D: Ix3 Provenance Assessment, R: Ix5 Provenance Belief]
  - xvi. introducing class: **Ix1 Meaning Comprehension**
  - xvii. introducing property Jxx10 interpreted meaning of [D: Ix1 Meaning Comprehension, E73 Information Object]
  - xviii. introducing property Jxx11 interpreted meaning as [[D: Ix1 Meaning Comprehension, R: Ix2 Intended Meaning Belief]
  - xix. and updating all the FOL statements and examples in said class/property definitions.

For details of each definition see [Appendix](#).

### Discussion points:

- DO to consult with Francesca Bologna on the validity of the examples and the full citation for the example of Jxx4 assumed provenance.
- Examples for Jxx10, Jxx11 could be redrafted if one can come up with suitable, non-fictitious ones (but in a new issue).
- Concerning J11 used manifestation, it seems legit for LRMoo, could possibly find its way there.

The SIG voted whether to admit the remodeling proposed by MD & PF

### Outcome of the vote:

In favor: 13 (11 in person, 2 online)

Against: none

(9 participants abstained)

### References of examples:

- Bologna, F. (2021) 'Who was Nero?', *The British Museum Blog*, 22 April. Available at: <https://www.britishmuseum.org/blog/who-was-nero> (Accessed: 10 April 2023).
- Hodder, I. (1999) *The Archaeological Process: An Introduction*. Oxford: Blackwell.
- Pernicka, E. et al. (2020) 'Why the Nebra Sky Disc Dates to the Early Bronze Age. An overview of the Interdisciplinary Results', *Journal on the Archaeology of Europe*, 104, pp. 89–122. doi:10.1553/archaeologia104s89.

### How to move forward:

- HW:** DO to consult with Francesca Bologna on the plausibility of the examples.
- HW:** PF & SdS to assign identifiers to the new properties, update the document and issue the new release of CRMInf –which will reference CIDOC CRM v7.1.2
- HW:** SdS to check the CRMInf document for misspelled instances of “extant”.
- HW:** MD & PR to check whether J11 used manifestation fits LRMoo as is, or if it needs tweaking.
- Start a [new issue \(646\)](#) about redrafting the introduction of CRMInf, making use of the example of the fire burning down Rome and Nero’s contested whereabouts at the time of the fire.  
**HW** assigned to PF, TV.  
**HW:** GH could implement this example once the rdf becomes available.
- Start a [new issue \(645\)](#) to discuss the negation of a belief (**MD, PF** to work on that)
- Start a [new issue \(648\)](#) to discuss shortcutting knowledge/belief sharing –i.e., without having to go through an infinite number of intermediate steps (**MD, PF** to work on that)
- Start a [new issue \(647\)](#) about automatically detecting incompatibilities between CRM extensions and CIDOC CRM.  
**HW:** PF and ETz to work on that. Consult with VA (LAHRA), because OntoME does exactly that.

### Issue closed

[NEW ISSUE]: negating beliefs

The SIG resolved to start an issue where to discuss the implications of negating an instance of I2 Belief.

**HW:** MD & PF to work on that

[NEW ISSUE]: shortcutting knowledge/ belief sharing

The SIG resolved to start an issue where to discuss shortcutting knowledge/belief sharing –i.e., without having to go through an infinite number of intermediate steps

**HW:** MD, PF to work on that

[NEW ISSUE]: redraft the introduction of CRMInf

The SIG resolved to redraft the introduction of CRMInf, making use of the example of the fire burning down Rome and Nero’s contested whereabouts at the time of the fire. It is to be discussed in a new issue.

**HW** assigned to PF, TV.

[NEW ISSUE]: automatically detect incompatibilities between CRM extensions and the CIDOC CRM.

The SIG resolved to start a new issue in order to automatically detect incompatibilities between the CIDOC CRM & its extensions.

**HW:** PF & ETz to work on that.

Consult with VA (LAHRA), because OntoME does exactly that.

Issue 568: Incorporate changes in the model implemented by the ISO group to the versioning pipeline of the SIG

Update by PM & EC on the ISO submission process. Link to their presentation [here](#).

**Proposal for updates:**

1. Definition for “query containment”: three alternatives
  - i. Modify the definition in order to yield for grammatical sentences if the term is to be substituted by its definition
  - ii. Integrate definition for “query containment” in “query”
  - iii. Remove the entry/definition altogether.
2. Images do not adhere to format requirements: alternatives
  - i. Removing images from the ISO version
  - ii. Removing text from the diagrams
  - iii. Changing the size of the diagrams to allow text therein be easier to read
- Whether the remaining editorial suggestions that will be implemented for the ISO version (listed below) should find their way into subsequent community versions.
  - 1) Specifying the clause number when referring to other sections, eg. "see section About Types below" → "see section About Types (8.3.1) below"
  - 2) Formatting ordered lists
    - i. The default order for a numbered list is: a), b), c) | 1), 2), 3) | i), ii), iii)
    - ii. Avoid having more than one numbered list in a clause/subclause
  - 3) Adding additional numbered sections**
    - i. To break up the long clauses
    - ii. To remove the existence of hanging paragraphs
  - 4) Change phrases like "In the following..." to have explicit references**

- 5) **Review use of “must”, “may”, “can”, “should”, and “shall” against ISO’s instructions on the use of these terms**
- 6) Use quotes instead of italics to emphasize terms
- 7) **Refer to bibliography [number] instead of (Author, Date) for in-text citations**

**Discussion points:**

- Definition for “query containment”: It only occurs 4 times in the text.
  - 2 instances in the definition of the term,
  - 1 instance in the definition of “semantic interoperability”,
  - 1 instance in the “Extensions of CIDOC CRM” section, where it is defined in a manner that is consistent with the ISO format requirements.
- **Proposal to deprecate the term from the terminology list.**
- Images do not adhere to format requirements: SIG unwilling to deprecate figures, deprecate text from figures & move it to illegible captions. In favor of having figures (+captions) cover full pages. **Proposal: Their orientation could be shifted to portrait (rotated by 90°) to ensure legibility.**
- Whether the remaining editorial suggestions that will be implemented for the ISO version (listed below) should find their way into subsequent community versions.
  - 1) Point **(3)** above: a welcome improvement
  - 2) Point **(7)** above: not happening, this is in line with the community’s practices.
  - 3) Point **(4)** above: to be examined in a case-by-case basis. If it refers to a specific numbered section, then it’s OK to replace phrases like “in the following” with the numbered section. If it’s just interpreted as pointing to the next paragraph, then it should be considered as an organizational feature of the text and should be left as is.
  - 4) Point **(5)** above: need to be given explicit guidelines against which to check the use of modal verbs –EC to circulate the document through the listserv.
  - 5) No concern was voiced regarding points (1), (2) and (6).

Presentation of the CIDOC CRM (Mexican) Spanish Translation Initiative; Edurne Uriarte & Pedro Angeles

Link to the presentation [here](#).

**Discussion points:**

- PM invited EU & PA to participate in the CIDOC CRM Translation WG, and offered to exchange expertise and insights regarding problems and solutions that they have reached at the Canadian-French Translation Initiative and the Translation WG as well.
  - 1) f.i.: they abide by the rule to consult the scope notes and derive meaningful labels in the target language for the classes/properties that a word-for-word translation won’t work.
- AG also offered to share material and resources of the European-French Translation Initiative as well.

Thursday 11 May 2023

Issue 431: Make methodology clear

The SIG reviewed HW by CM –an update of the definition for “class” listed under terminology. The details of the proposal can be found in the [appendix](#).

The SIG voted whether to admit the proposed change

**Outcome of the vote:**

In favor: 13 (11 in person, 2 online)

Against: none

(11 participants abstained)

**Decision:** the text to appear on the definition of CIDOC CRM v7.2.3

**Issue closed**

Issue 498: The scope note of E53 can be sets of contiguous areas

The SIG reviewed MD's HW (an example of a non-contiguous area that counts as an instance of E53 Place):

- The land area belonging to country Japan (日本国) in 2021 CE [In 2021, the Japanese nation comprised 6852 islands extending along the Pacific coast of Asia]

Bibliographic reference:

- Wikipedia (2023) 'Japan', *Wikipedia; The Free Encyclopedia*. Available at: <https://en.wikipedia.org/wiki/Japan> (Accessed: 9 February 2023).

The SIG voted whether to admit the example in the definition of CIDOC CRM v7.2.3

**Outcome of the vote:**

In favor: 13 (11 in person, 2 online)

Against: none

(11 participants abstained)

**Decision:** the text to appear on the definition of CIDOC CRM v7.2.3

**Issue closed**

**Nb:** If anyone comes up with a better example, they should feel free to share it through the listserv.

Issue 635: property quantification mismatches

The SIG reviewed HW by WS & MD on the property quantifications that needed to be amended.

Properties concerned are:

- P10 falls within (contains) [D: E92 Spacetime Volume, R: E92 Spacetime Volume]
- P81 ongoing throughout [D: E52 Time-span, R: E61 Time Primitive]
- P89 falls within (contains) [D: E53 Place, R: E53 Place]
- P99 dissolved (was dissolved by) [D: E68 Dissolution, R: E74 Group]
- P161 has spatial projection (is spatial projection of) [D: E92 Spacetime Volume, R: E53 Place]
- P187 has production plan (is production plan for) [D: E99 Product Type, R: E29 Design or Procedure]
- P188 requires production tool (is production tool for) [D: E99 Product Type, R: E19 Physical Object]
- P198 holds or supports (is held or supported by) [D: E18 Physical Thing, R: E19 Physical Thing]

For details see [Appendix](#).

Concerning property *P191 had duration (was duration of)* [D: E52 Time-Span, R: E54 Dimension]: there's an ongoing discussion among WS & MD on this. Once they have reached a decision, they will start an evote through the listserv.

**Outcome of the vote:**

In favor: 10 (9 in person, 1 online)

Against: none

(15 participants abstained)

**Decision:** the correct quantifications to appear on the definition of CIDOC CRM v7.2.3. Request that these edits make it to the ISO version –contact PM & EC to take care of this.

Issue 636: update the list of property quantifiers

The SIG reviewed the HW by WS (updated list of property quantifiers) and debated over admitting the new quantification definitions found below in the specification document.

*(1,1:0,1): one to one, necessary*

An individual domain instance of this property must have exactly one instance of this property, but an individual range instance cannot be referenced by more than one instance of this property. In other words, this property is necessary and not repeatable for its domain, and optional but not repeatable for its range.

*(1,n:1,n): many to many, necessary, dependent*

An individual domain instance and range instance of this property must have at least one instance of this property. In other words, this property is necessary and repeatable for its domain and range.

**Discussion points:**

- Arguments against deprecating property quantifications explanations that do not occur in the specification document. Addition of new properties might end up reintroducing explanations of said property quantifications. They also happen to appear in extensions –f.i. LRMoo uses (1,1:1,n)
- New property quantifications should make it in the community version (i.e. 7.2.3). Whether they also make it to the ISO version is up to PM & EC to decide.

The SIG voted in favor of adding the two property quantifications

**Outcome of the vote:**

In favor: 13 (11 in person, 2 online)

Against: none

(9 participants abstained)

Issue 615: scope note of E13 Attribute Assignment

The SIG discussed deleting the last paragraph of the scope note of E13 Attribute Assignment, following the proposal by MD & WS, on the grounds that it confounds the reification with the ontological justification of the shortcut path.

**Discussion points:** The confusion between a statement seen as information and a statement as being as something that holds in reality is mentioned in the Principles document. The unwarranted addition of



the paragraph about shortcutting over properties should be made into an example for that. To be used as an example in the issue about the didactic material ([642](#) –relevant module: Making and Extending Ontologies).

The SIG voted in favor of deprecating said paragraph. Details of the proposal in the [appendix](#).

**Outcome of the vote:**

In favor: 12 (10 in person, 2 online)

Against: none

(10 participants abstained)

**Decision:** update the scope note in CRMbase v7.2.3 (and, if it's still an option, also v7.1.3).

Issue 523: didactic material for the properties of E93 Presence

MD presented [HW](#): the trip of A. von Humboldt to Venezuela (for which there is adequate documentation) cast as the instance of E93 Presence of A. von Humboldt, and making use of all the relevant constructs.

GH has produced the rdf for the example and it was demonstrated in the rdf viewer.

The example serves to illustrate the usefulness of E93 Presence, in that it allows partitioning narratives into separate (externally/arbitrarily defined) chunks.

The SIG voted in favor of admitting this example in the didactic material of the CRM intended to illustrate the best use of the E93 Presence construct.

**Discussion points:**

- Maybe the examples should be linked to the scope note of E93 Presence in the classes/properties' declarations. To be considered.
- Publishing the example, would mean that it can be referenced as a publication later on.

The SIG voted in favor of admitting the example of von Humboldt's trip to Venezuela, as well as drafting new examples for the Notre Dame de Paris Restoration and Neros' whereabouts during the fire that devastated Rome.

**Outcome of the vote:**

In favor: 10 (8 in person, 2 online)

Against: none

(12 participants abstained)

**How to proceed:**

- In order for the example to be useful it needs to be put into a cohesive text.  
**HW:** AG to help draft the texts for the Humboldt example, also work on the Notre Dame de Paris Restoration example.  
**HW:** PF to work on the example for Nero (relevant for CRMtex as well)  
**HW:** GH to work on the graphics
- **HW:** PF to produce rdf files for the set of examples once he has access to all the relevant material.

- Once all the material has been turned in and collated, the SIG will determine whether to either publish it through the website or to publish as a scientific publication to be referenced by the didactic material (and the definition of E93 Presence as well).

Issue 534: Representing .1 properties of full paths in shortcut properties

The SIG resolved to postpone the issue until the 57<sup>th</sup> meeting.

Issue 588: Common policy/ method for implementing the .1 properties of base and extensions in rdf

PF walked the SIG through the remainder of the HW that had not been reviewed in the 55<sup>th</sup> SIG meeting.

*E: Proposal to distinguish the constructs that are not part of the official definition of CIDOC CEM (only part of the implementation)*

Xml comments in the PC module that explain how some constructs are part of the rdfs implementation, in the sense that the n-ary relations postulated in the definitions and FOL cannot be rendered in rdfs without a reification construct.

Some editing took place and then the SIG voted in favor of admitting the revised statement (details in the [appendix](#)).

- The SIG voted on admitting the new statement:

**Outcome of the vote:**

In favor: 13 (11 in person, 2 online)

Against: none

(9 participants abstained)

**Proposal:** turn the comments into standardized <rdfs:comment> statements, to appear in the Main\_CRM.rdf implementation, like metadata about the encoding decisions that have been implemented in the rdf file.

- The SIG voted on the proposal above -to be implemented by PF & ETz.

**Outcome of the vote:**

In favor: 7 (5 in person, 2 online)

Against: none

(15 participants abstained)

**HW:** PF & ETz to implement the changes in the PC file

*F: Enriching the pc file with scope notes for each PC\_item.*

Details of the proposal in the [appendix](#):

The SIG voted in favor of enriching the PC file with labels & scope notes

**Outcome of the vote:**

In favor: 9 (7 in person, 2 online)

Against: none

(11 participants abstained)

**HW:** PF & ETz to implement the changes in the PC file

*G: Include 'P04\_represents' connecting properties with their reified classes*

**Proposal:** Add a statement per PC property of the sort

```
<crm:P04_represents rdf:resource="Pxx_label_of_respective_property" />
```

Details of the proposal in the [appendix](#) (also see highlighted statements under appendix, 588, point [F](#):

```
<!--  
*** Property classes needed for implementing a substitute of n-ary relations defined in the  
CIDOC CRM ***  
-->
```

The SIG voted in favor of adding P04\_represents in the PC file

**Outcome of the vote:**

In favor: 7(5 in person, 2 online)

Against: none

(15 participants abstained)

**HW:** PF to implement the changes in the PC file

*H: Provide implementation guidelines*

**Proposal** to use reification methods only when the .1 is needed. If the .1 information is not necessary to represent, then use the original property. Only use property classes together with its respective original property.

**Discussion points:**

- The relation btw querying for PCs and their respective properties is on a par with that of querying for a shortcut and its corresponding fully articulated path. PC classes stand on the “fully articulated path”-hand of the analogy.  
The proposed recommendation expresses the idea that for each instance of a shortcut property one needs to implement the fully articulated path as well. This is an unwarranted notion.

**HW:** MD & PF to revise this particular recommendation, seeing as all alternatives should be valid.

Issue 360: LRMoo

*Update on outcome of world-wide review of LRMoo Version 0.9.3 (February 2023)*

PR gave an outline of the feedback that the LRMoo group have received. Editorial corrections and major updates feature in the [Version 0.9.4](#) that has been shared with the SIG.

*Topics up for discussion at the SIG*

- F27 Work Creation & R77 accompanies or complements
- R10 has member & R67 has part
- Intended Audience
- F31 Performance (relates to Issue 594)

*F27 Work Creation & R77 accompanies or complements*

Proposal to add a clause in each scope note that makes explicit what the source expression for an instance of F1 Work was –on a par with R2 is derivative of.

Details of the proposal in the [appendix](#).

The SIG voted whether to accept the explicit mention of the fully articulated paths in the scope notes of F27 and R77:

**Outcome of the vote:**

In favor: 9 (8 in person, 1 online)

Against: none

Abstain: 13

*R10 has member & R67 has part*

A proposal to reformulate R10 has member to keep it as distinct as possible from R67 has part. Details of the proposal in the [appendix](#).

**Discussion points:**

- **R10** should express a generalization over all the cases that are not covered by the more specific modeling constructs available.
- The scope note of **R10** should explicitly refer to its usage in documenting different databases integration, to reflect difference of opinion/practices: database A can list two distinct versions of a specific musical score/libretto/whatnot as instances of F1 Work or instances of F2 Expression.
- The scope note of **R10** should explicitly state that it applies to a “superwork” construct, i.e., one that allows statements of the sort “such-and-such instances of F1 Work form distinct versions of Symphony No.something (F1)”
  - Nb. The construct is easier to grasp if one’s examples are musical scores compared to adaptations of literary works into movie scripts.
  - Nb’. It is often the case that whereas the distinct versions of a certain F1 Work have numbered IDs, the superwork lacks one.
- Disambiguation can come from deprecating examples that are common to both **R10** and **R67**.
  - Only keep the example about all the known different-sized versions of Rodin’s “Le penseur” –but rephrase it to avoid making a reference to “La Porte de l’Enfer”
  - Consider making an example out of the known versions of Fidelio/Leonore, the creation of which has been carefully documented.
  - Consider making an example out of [Philokalia](#), a collection of texts written between the 4<sup>th</sup> and the 15<sup>th</sup> centuries AD by spiritual masters of the mystical heychast tradition of the Eastern Orthodox Church.
- Instead of making **R10** a relation btw instances of F1 Work, it can apply to an instance of E89 Propositional Object and an instance of F1 Work. This way its scope is broadened, and it becomes more compatible with the notion of ‘superwork’ that we talked about.

**HW:** PR, TA, MZ to reconsider –the new HW and ensuing evote to be assigned a new issue ticket ([649](#)).

*Expressing Intended Audiences*

The world-wide review of LRMoo revealed a mismatch between P103 was intended for (was intention of) on the one hand, and the intended audience attributes in IFLA-LRM plus the deprecated R39 is intended for (is target audience in) on the other.

The SIG had reached a decision in the 44<sup>th</sup> meeting to extend the scope note of P103 was intended for to cover intended audience attributes (for expressions, manifestations and audiences), but the edits never made it to the specification document.

**Proposal:**

Replace the existing scope note for P103 with the one that had been agreed upon in the 44<sup>th</sup> SIG meeting. Inform v7.2.3 and the ISO version (7.1.3) with this edit.

Details in the [appendix](#).

This is an editorial change, no call for a vote is required to implement it.

*Update concerning the formal approval of LRMoo*

Submit a new version (V0.9.5) of LRMoo that features all the updates agreed upon during the SIG meeting (they mostly rely on the feedback received from the world-wide review) well ahead of the IFLA Conference in late August 2023.

Given the consent of the IFLA Committee on Standards, the new LRMoo version, which addresses all topics identified during the world-wide review, will be submitted for a formal standards approval.

The IFLA Committee on Standards will extensively revise the model, and then it will be submitted to the Professional Council (in December 2023), and the ensuing version of the specification document will be numbered “1.0”.

At that point, they will start working on the rdfs implementation.

FOL is still pending, the formatting of .1 properties too, and also some quantification properties need updating.

[NEW ISSUE]: Redrafting the scope note of R10 has member

Upon discussing issue 360, the SIG resolved to start a new issue where to discuss the scope note of R10 has member.

Points that need be taken into consideration to draft the new scope note:

- **R10** should express a generalization over all the cases that are not covered by the more specific modeling constructs available.
- The scope note of **R10** should explicitly refer to its usage in documenting different databases integration, to reflect difference of opinion/practices: database A can list two distinct versions of a specific musical score/libretto/whatnot as instances of F1 Work or instances of F2 Expression.
- The scope note of **R10** should explicitly state that it applies to a “superwork” construct, i.e., one that allows statements of the sort “such-and-such instances of F1 Work form distinct versions of Symphony No.something (F1)”
  - Nb. The construct is easier to grasp if one’s examples are musical scores compared to adaptations of literary works into movie scripts.
  - Nb’. It is often the case that whereas the distinct versions of a certain F1 Work have numbered IDs, the superwork lacks one.
- Disambiguation can come from deprecating examples that are common to both **R10** and **R67**.

- Only keep the example about all the known different-sized versions of Rodin’s “Le penseur” –but rephrase it to avoid making a reference to “La Porte de l’Enfer”
- Consider making an example out of the known versions of Fidelio/Leonore, the creation of which has been carefully documented.
- Consider making an example out of [Philokalia](#), a collection of texts written between the 4<sup>th</sup> and the 15<sup>th</sup> centuries AD by spiritual masters of the mystical heychast tradition of the Eastern Orthodox Church.
- Instead of making **R10** a relation btw instances of F1 Work, it can apply to an instance of E89 Propositional Object and an instance of F1 Work. This way its scope is broadened, and it becomes more compatible with the notion of ‘superwork’ that we talked about.

**HW:** PR, TA, MZ to redefine R10 taking the points above in consideration.

Issue 594: Semantically replacing Recording Event and Externalization Event

TA presented HW -a proposal to either deprecate F31 Performance or to redraft the modeling constructs around it –especially its relation to F28 Expression Creation and F1 Work.

Details in the [appendix](#).

**Discussion points:**

- What the relation of F31 Performance to F1 Work does, is exclude the explicit mention to such-and-such version of a specific work, because the model can make use of P15 was influenced by to document the exact translation/rendition/version of a given instance of F1 Work on which the performance was based on. The reference could be through an F2 Expression/F3 Manifestation or whatnot. However, R80 performed ensures that the most critical piece of information (the relation to the F1 Work, which typically appears in documentation systems) is in fact documented.
- Best declare R80 performed as a shortcut property, and have the fully developed path explicitly reference the instance of F2 Expression that realizes the F1 Work.
- CRMbase is missing a documentation activity. We have a designated class (E31 Document) but not an activity leading to its production. Consider the creation of an extension that covers the documentation activity. The ensuing modeling construct would come in handy for the documentation of recording things for archival preservation and not in the sense of the performance arts (contrary to the modeling proposed for LRMoo).

The SIG voted whether to retain F31 Performance and introduce the properties linking it to F1 Work and F28 Expression Creation.

**Outcome of the vote for retaining F31 Performance:**

In favor: 11 (9 in person, 2 online)

Against: none

(11 participants abstained)

**Decision:** it is kept in the model.

**Outcome of the vote concerning the introduction of R80 performed & R81 recorded:**

In favor: 11 (9 in person, 2 online)

Against: none

(11 participants abstained)

**Decision:** they will be introduced in the model, following editorial improvements.

**HW:** TA will be circulating the updated versions through the listserv.

Issue 588: Common policy/ method for implementing the .1 properties of base and extensions in rdf (continuation)

*Point I:*

**Proposal** to not introduce a PC for the inverse directionality of the corresponding property, on the grounds that it would call for both PCx and PCx-i to instantiate the domain of the corresponding Px.1, and it would also make querying more complex, especially when it is not known which version of the PC is used in the relevant datasets.

**Decision:** the SIG agreed to not implement this change

*Point J: Best practice for reification*

The SIG unanimously accepted the proposal by PF to start a new issue where to discuss the ontological status of the PC properties and the kinds of statements that one can make about them. For the new issue, see ticket [640 \(Statements about statements\)](#)

*Point K: Defining PCO\_Typed\_CRM\_Property a subclass of E1*

The SIG briefly discussed the proposal by GB to declare PCO\_Typed\_Property a subclass of E1 and his intention to implement locally it. There was no consensus wrt this particular approach in the discussion on the listserv.

Its topic relates to the issue discussed for [point J](#) above.

Alternatively, it could be an issue about documenting the provenance of .1 properties.

Issue 613: Inverse shortcuts (continuation: definition of different kinds of shortcuts)

The SIG discussed the redrafted definitions of shortcut, inverse shortcut, strong shortcut that are to appear on the specification document. The details of the proposal are found in the [appendix](#).

**Discussion points:**

- **the last clause** seems like a non-sequitur. But it serves to indicate that the path through E13 Attribute Assignment forms a way to establish a property, just as shortcuts do.
  - The class E13 Attribute Assignment allows for the documentation of how the assignment of any property came about, and whose opinion it was, even in cases of properties not explicitly characterized as “shortcuts”.
  - **HW:** CEO to draft a note that the path created by an instance of E13 Attribute Assignment is not shortcut by any property should be added to the clause.
    - **A proposed wording by SdS goes as follows:** *Contrary to this, E13 Attribute Assignment (and the properties it makes use of) does not form a long path over the path that is being described by the E13 Attribute Assignment, in cases where the property being so described is actually a shortcut.*
- Examples need to be added to each type of shortcut.

**HW:** CEO to draft them

- The term “shortcuts” under terminology needs to point to the “Shortcuts” section in the Introduction.

In/Tangible European Heritage – Visual Analysis, Curation and Communication  
Presentation by Matthias Schlögl (ACDH-CH)

Link to presentation [HERE](#)

Planning the SIG’s activities for CIDOC 2023 - Mexico

- Information about CIDOC 2023 Conference in Mexico [HERE](#).
- There will a WG sessions on the last Sunday before the conference, which can be used as an outreach session.
- There will be a non-CIDOC event that GB will be coordinating, intended to teach scholars based in Mexico and Latin America in general use the CRM. He will be devising a program shortly after and will be reaching out to people individually to see if they are willing/able to help on certain topics.
  - SdS has been working on material for a workshop on CRMarchaeo, using archaeological data documentation. Aside Belfast and Vienna, he can run it in the CRM pre-CIDOC 2023 event as is, or he can do a general workshop.
  - The materials discussed on the 56<sup>th</sup> CIDOC CRM SIG (Day 1) will come in handy for the training material presented in Mexico.

Planning the SIG’s meetings for 2024

The editorial board’s proposal is to continue with the two meetings per year policy. The proposed timeline is to have a meeting in the spring (**19-22 March 2024**) and another one in the autumn (September 2024).

MR has offered to host the spring meeting at the BNF (in Paris). She will be making formal inquiries about it at the BNF and she’ll communicate with the SIG to let us know whether this is, in fact, possible. EC has offered to host the meeting at the University of Oxford, if the BNF turns us down.

The exact dates of the autumn meeting will be determined after the CIDOC 2024 Conference has been announced (to avoid conflict with such a major event). So probably during the 57<sup>th</sup> CIDOC CRM SIG & 50<sup>th</sup> FRBR/LRMoo SIG meeting, in Marseille.

Friday 12 May 2023

Issue 583: How to assign dimensions to relative positions/ to distances in space-time and other relations between observable entities

The SIG reviewed MD’s proposal to introduce a modeling construct in CRMsci. The details of the proposal can be found in the appendix.

- [Sxx2 Relative Dimension](#) (IsA E54 Dimension), and corresponding property
  - [Oxx6 is relative to \(has relative dimension\)](#): S15 Observable Entity [IsA O12 has dimension (is dimension of)]
- [Sxx3 Angle](#) (IsA Sxx2 Relative Dimension), and corresponding property
  - [Oxx7 has vertex \(is vertex of\)](#): S15 Observable Entity [IsA Oxx6 is relative to (has relative dimension)]



### Discussion points:

- Property quantifier used in **Oxx6 is relative to (has relative dimension)** “many to many, necessary two (2:n,0:n)” has not been properly introduced in any model so far. It has to be defined. Relevant for CRMbase too.
- A historical example of calculations based on a vertex is needed for Oxx7 has vertex (is vertex of) is needed: calculations used by Aristarchus of Samos to infer the distance of the Sun and Moon from the Earth and measure their circumference.  
**HW:** for MD & AG formulate the examples and find good citations.

The SIG voted whether admit the new modeling constructs in CRMsci (v2.1).

### Outcome of the vote:

In favor: 8 (5 in person, 3 online)

Against: none

(13 participants abstained)

### Decisions:

- said constructs to be introduced in the model (v2.1).
- AK & TV to take care of assigning them number identifiers in the new release.
- **HW:** MD & AG to formulate missing examples and provide citations for them
- **HW:** MD & CEO to define the missing property quantification “many to many, necessary, two (2:n, 0,n)”.

Issue 625: 013 “triggers” scope note

The SIG reviewed the proposal by MD to redraft the scope note of **O13 triggered (was triggered by)**. Details of the proposal can be found in the [appendix](#).

The SIG voted whether admit the redrafted definition of O13 triggered in CRMsci (v2.1).

### Outcome of the vote:

In favor: 8 (6 in person, 2 online)

Against: none

(13 participants abstained)

Issue 602: determine the interface between CRMsci and CRMinf

TV & AK proposed to deprecate S5 Inference Making in CRMsci v2.1 and only keep it in CRMinf, where it should be declared a subclass of E13 Attribute Assignment (to ensure that the subclasses of S5 –namely S6 Data Evaluation, S7 Simulation or Prediction –can still be declared subclasses of I5 Inference Making).

Nb. S8 Categorical Hypothesis Building describes a kind of inferencing that applies more broadly than CRMsci and sits more closely with CRMinf anyhow (so it can be moved to CRMinf on these grounds).

For an illustration of the implications for CRMsci and CRMinf, see [attached](#).

### Discussion points:

- Replicating equivalent classes across models is not ideal.

- From a conceptual point of view, CRMInf has a broader scope compared to CRMsci and makes use of constructs defined in CRMsci to document the way that knowledge was obtained through making observations. In that sense, only defining Inference Making in CRMInf and altering its semantics to make it compatible with S6, S7 forms a more economical solution.
- However, if one wants to only use CRMsci they would not have access to the wrapper class S5 Inference Making in this scenario. If S5 is declared a subclass of I5, instead then this would be in line with the relation postulated between the two models, as well as the semantics postulated for S6, S7, S8 (IsA S5 Inference Making, for which it holds that IsA I1 Argumentation AND E13 Attribute Assignment).
- Declare dependency from CRMsci to CRMInf, wrt Inference Making.

#### Decisions:

- Accept the proposal by AK & TV.
- Inform CRMsci (V2.1) of the decision,
- Update CRMInf (i.e., declare I5 IsA E13 as well, move S8 to CRMInf).

**HW** to AK, SdS, PF & MD:

To check that the scope notes for I5 and S5 do not have clashing semantics in any way. If there are any mismatches, the SIG should reconsider declaring S5 a subclass of I5 and retaining them in both models.

Issue 556: [Content of the minimal vocabularies for restricting the CIDOC CRM Types](#)

TV brought the SIG up to speed with the developments in the issue. At present things stand like that:

- **HW:** SdS to proof-read it the text that MD has drafted regarding the functional role of the minimal vocabulary (pending decision from the 55<sup>th</sup> SIG Meeting).  
The text is to appear in the introductory section of the CIDOC CRM, right after “About types” after SdS is done editing it.
- **HW:** MD to share the outcomes of the work he’s undertaken wrt the classification of geopolitical units with the SIG.

The details of classes & typed properties to be rendered through types, plus the relevant types can be found in the [appendix](#).

#### Discussion points:

- Wrt. E49 Time Appellation: there are other things that a time appellation would stand as a characterization of (such as reigns of emperors, ceramic styles, etc.) that do not conform to the “dates (spans of time)” definition of the AAT.
- Wrt. E58 Measurement Unit: the type specifications listed in the ISO refer to standard units of measurement, hence not historical non-standardized ones. There should be a note that historical standards are not covered by the ISO for Quantities and Units.

The SIG voted whether to admit the type-recommendations for deprecated classes and existing classes/typed properties.

#### Outcome of the vote:

In favor: 9 (8 in person, 1 online)

Against: none

(12 participants abstained)

### Summary of Decisions:

- The type recommendations for deprecated classes and the type recommendations for existing classes & typed properties, as well as the functional role of the minimal vocabulary will be accessible as a separate document.
  - The SIG is to reconsider whether it can appear as an appendix to the specification document.
- Discuss the scope notes of typed properties in [a new issue](#). P62.1, P67.1, P138.1, P189.1 are the most pressing (cryptic scope notes, lack of examples in some).

### *Concerning deprecated classes:*

- E40 Legal Body: Map to E74 Group and provide a list of loose recommendations from AAT to be used as types in implementations where one would need to specify the type of E74 Group. Some relevant types are: “corporate bodies” and “corporations”. Open to other relevant suggestions. **HW** to TV to implement.
- E46 Section Definition: Map to E41 Appellation, refrain from making any recommendations on the grounds that the AAT does not provide useful matching concepts.
- E47 Spatial Coordinates: Map to E94 Space Primitive, refrain from making any recommendations concerning the appellation’s type specification
- E48 Place Name: Map to E41 Appellation and add the type “place names” from AAT.
- E49 Time Appellation: Map to E41 Appellation and add the type “dates (spans of time)” from AAT.
  - **HW**: TV to identify the terms in the AAT that could be used to cover instances of named periods (reigns of emperors, ceramic styles, ...) that would be characterized as Time Appellations (E49).
- E50 Date: Map to E61 Time Primitive, refrain from making any recommendations concerning the appellation’s type specification
- E51 Contact Point: Map to E41 Appellation and add the type “addresses (communications concepts)”
- E75 Conceptual Object Appellation: Map to E41 Appellation, refrain from making any recommendations concerning the appellation’s type specification
- E82 Actor Appellation: Map to E41 Appellation, provide a list of loose recommendations from AAT (depending on the specification of the instance of Actor they apply to): “personal names”, “corporate names”, ...
- E84 Information Carrier: Map to E22 Human-Made Object, add a type “information forms” from AAT.

### *Concerning type restrictions of existing classes & restrictions to typed properties.*

- E4 Period: MD is working on interpretations of geopolitical units etc. that should be useful for specifying the type of instances of E4 Period. He will be sharing it with the SIG.
- E10 Transfer of Custody:
  - no recommendation regarding the specification of “legal responsibility”,

- “possession (property right)” of AAT stands as a recommendation for the specification of “physical possession”.
- no recommendation regarding the specification of “illegal possession” (no relevant entries in the AAT).
- E15 Identifier Assignment: create a term for the “CRM thesaurus” that will express the concept “preferred identifier assignment”
- E34 Inscription: refer to the type classification found in the [ISO 15924] (Codes for the representation of names of scripts” to specify “types of alphabets” mentioned in the scope note.
- E57 Material: no recommendation for types of materials
- E58 Measurement Unit: refer to the classification found in the [ISO 80000-1:2009] for quantities and units to specify the “types of units” mentioned in the scope note.
  - **HW:** TV to draft a note that ancient/historical, non-standardized, measurement units are not referenced through the [ISO 80000], as such units are particularly relevant for archaeological and historic documentation.
- P3.1 has note: no recommendation for “type of encoding” or “type of note” mentioned in the scope note.
- P14.1 in the role of: no recommendation for “type of role” mentioned in the scope note.
- P16.1 mode of use: no recommendation for “type of use” mentioned in the scope note.
- P137.1 in the taxonomic role: make GBIF terminology a recommendation for natural history and ceramic classification
  - **Nb.** other vocabularies may be suitable for things like archival description fonds etc.
- P19.1 mode of use:
- P62.1 mode of depiction: **scope note update** needs to be resolved **prior to type specification – see new issue**
  - **Nb.** HW to AK & TV to lookup Iconclass for “mode of depiction” type restrictions.
- P67.1 has type: **scope note update needs to be resolved prior to type specification –see new issue**
- P138.1: mode of representation: **scope note update needs to be resolved prior to type specification –see new issue**
- P69.1 has type: no recommendation concerning the “nature of the association to be specified” mentioned in the scope note.
- P102.1 has type: reference child-terms of AAT “titles (general, names)” to classify types of titles.
- P107.1 kind of member: no recommendation for “type of membership or (type of) role the member has in the group”, mentioned in the scope note.
- P130.1 kind of similarity: no recommendation concerning the “further clarification of the relationship” referred to in the scope note
- P139.1 has type: no recommendation for the “type of derivation” mentioned in the scope note. PR confirms IFLA practice.
- P144.1 kind of member: no recommendation to specify the “type of membership” mentioned in the scope note.
- P189.1 has type: **scope note update and example illustrating the use of the typed property needs to be resolved prior to type specification—see new issue.**

[NEW ISSUE]: Scope-note update for typed properties

Typed properties are as a rule poorly defined. They must be redrafted considering the guideline for writing scope notes (see [here](#)). The problem is particularly pressing for properties

- P62.1 mode of depiction,
- P67.1 has type,
- P138.1 mode of representation, and
- P189.1 has type.

But that doesn't mean that the other typed properties are properly defined.

Issue 587: Principles for Modelling Ontologies: A short Reference Guide [introduction and examples for didactic purposes]

The SIG reviewed the provenance statement for the research questions that motivated the modelling decisions implemented in the course of the project SEALIT. The text can be found in the [appendix](#).

The provenance statement is supposed to appear in a separate section of the site, called "Methodology and research questions supporting ontology building", found under "Use & Learn" (see issue [601](#)). A mockup of the designated subsite can be found [here](#).

The provenance statement is intended to head a section consisting of the research questions for SeaLiT (presented at the 55<sup>th</sup> CIDOC CRM SIG meeting), the queries (demonstrated in Day 1 of the meeting) and the sparql queries they represent (HW that PF is currently working on).

**Discussion points:**

- The section "Research questions in support of ontology building" now lacks a proper description.
  - AG shared a presentation about the purpose and overall utility of sharing contextualized research questions that motivate particular modeling decisions in the course of a project. The statement is in French, she can have it translated into English and share it with the SIG.

The SIG voted whether to accept the provenance statement by PF & AK

**Outcome of the vote:**

In favor: 10 (9 in person, 1 online)

Against: none

(11 participants abstained)

**Decision:**

- Publish mockup page for research questions under Use&Learn\Methodology for the time being. Update it as more material becomes available.
- HW to AG & PF to provide the statement for the overall purpose of sharing research questions

Issue 601: publish research questions on the website

The SIG reviewed the [mockup page](#) for "Methodology and research questions supporting ontology building", found under "Use & Learn\Methodology". It consists of 4 subsections:

- i. Methodology for ontology building (the last two edited versions of the *Principles for Modelling Ontologies: A short reference guide*)
- ii. Principles for Modelling ontologies -enhanced with use cases of bottom up modelling (the introduction of the short reference guide, new class/property admission checklist, polysemic concepts differentiation in the form of ontological classes)
- iii. Guidelines for writing scope notes & annotated examples
- iv. Research questions in support of ontology building (scientific questions in archaeology, SealIT, Notre Dame de Paris, PhD by S.Hennicke, CRM Requirement Analysis)

**Discussion points:**

- Strictly speaking the mockup does not qualify as a “Use & Learn” material, but since the site will be drastically updated soon, it can be published there for the moment.

**Decision:**

- Publish it as it is
- Appoint HW to draft short descriptions for each subsection.

## APPENDICES

### I: Name abbreviations

AF	Achille Felicetti	
AG	Anais Guillem	
CEO	Christian-Emil Ore	
CM	Carlo Meghini	
DO	Dominic Oldmann	
EC	Erin Canning	
ETz	Elias Tzortzakakis	
EU	Eduarne Uriarte	
FM	Francesca Murano	
GB	George Bruseker	
GH	Gerald Hiebel	
MD	Martin Doerr	
MK	Markos Katsianis	
MR	Mélanie Roche	
MS	Matthias Schlogl	
MZ	Maja Zumer	
PA	Pedro Angeles	
PF	Pavlos Fafalios	
PM	Philippe Michon	
PR	Pat Riva	
RS	Robert Sanderson	
SdS	Stephen D. Stead	
TA	Trond Aalberg	
TV	Thanasis Velios	
VA	Vincent Alamercery	
WS	Wolfgang Schmidle	

### II: Documents reviewed by the SIG

Managing the SIG's involvement in launching a new extension -a proposal by Stephen Stead

In order to facilitate progress on issues concerning CRMbase and the overall community, it is suggested that work on extensions be devolved to separate Working Groups. The membership of such WGs would be self-selecting from the community of specialists in the relevant area.

Each group would then craft a motivation statement that would cover at least the following points:

- i. The topics to be addressed
- ii. The process that will be followed
- iii. The timetable for the activities
- iv. What, if any, support will be required from the main body of the SIG.

This statement should be presented to the main SIG at the next meeting. When the Topics detailed in the motivational statement have been dealt with the WG should report back to the main body of the SIG. To facilitate this, two documents should be circulated at least 2 weeks before the SIG meeting.

The first is a complete and fully revised copy of the extension document that incorporates all the recommendations that the WG are making. This revised extension document should be formatted using the latest templates and best practice guidance to facilitate the production of web and serialisation resources. In the unlikely event of the WG asking for alternatives to be selected from by the main body of the SIG, then each possible outcome should have a complete extension document prepared. This will facilitate the quick publication of the selected alternative.

The second submission is a detailed change document. It should be divided into two parts. The first should detail all substantive or major changes, including new classes or properties, changes to scope notes and adjustments to Quantification. These changes should be supported by explanatory notes that detail why the proposed changes were necessary and including any alternatives that were considered. If the SIG is being asked to select between alternatives, then the reasons or arguments that caused the WG to be unable, or unwilling, to propose a single solution should be fully rehearsed so the SIG as a whole can make an informed decision. It should be noted that this is NOT the preferred state of affairs: the point of the WG is that the specialists in the sub-domain provide the optimal, informed solution. The second part of the change document should detail all minor changes, like correcting typos, adjusting labels or adding and improving examples.

Issue 613:

Scope note updates (to correctly express the shortcut-fully articulated path relations)

*P89 falls within (contains)*

NEW

**P89 falls within (contains)**

Domain:

E53 Place

Range:

E53 Place

Quantification:

many to many, necessary, dependent (1,n:1,n)

Scope note:

This property identifies an instance of E53 Place that falls wholly within the extent of another instance of E53 Place.

It addresses spatial containment only and does not imply any relationship between things or phenomena occupying these places.

This property is a part of the fully developed path from E93 Presence through *P161 has spatial projection*, E53 Place, *P89 falls within (contains)* to E53 Place.

This property is a part of the fully developed path from E53 Place, *P89 falls within*, E53 Place, *P168 place is defined by* to E94 Space Primitive through a declarative Place that is not explicitly documented, to a Space Primitive: declarative places are defined in CRMgeo (Doerr and Hiebel 2013).

This property is a part of the fully developed path from E53 Place, *P89i contains*, E53 Place, *P168 place is defined by* to E94 Space Primitive.

This property is transitive and reflexive.



Examples:

- The area covered by the World Heritage Site of Stonehenge (E53) *falls within* the area of Salisbury Plain (E53). (Pryor, 2016)

In first-order logic:

$P89(x,y) \Rightarrow E53(x)$   
 $P89(x,y) \Rightarrow E53(y)$   
 $[P89(x,y) \wedge P89(y,z)] \Rightarrow P89(x,z)$   
 $P89(x,x)$

OLD

### **P89 falls within (contains)**

Domain:

E53 Place

Range:

E53 Place

Quantification:

many to many, necessary, dependent (1,n:0,n)

Scope note:

This property identifies an instance of E53 Place that falls wholly within the extent of another instance of E53 Place.

It addresses spatial containment only and does not imply any relationship between things or phenomena occupying these places.

This property is transitive and reflexive.

Examples:

- The area covered by the World Heritage Site of Stonehenge (E53) *falls within* the area of Salisbury Plain (E53). (Pryor, 2016)

In first-order logic:

$P89(x,y) \Rightarrow E53(x)$   
 $P89(x,y) \Rightarrow E53(y)$   
 $[P89(x,y) \wedge P89(y,z)] \Rightarrow P89(x,z)$   
 $P89(x,x)$

*P125 used object of type (was object of type used in)*

NEW

### **P125 used object of type (was type of object used in)**

Domain:

E7 Activity

Range:

E55 Type

Superproperty of:

E7 Activity. P32 used general technique (was technique of): E55 Type

Quantification:

many to many (0,n:0,n)

Scope note:

This property associates an instance of E7 Activity to an instance of E55 Type, which classifies an instance of E70 Thing used in an instance of E7 Activity, when the specific instance is either unknown or not of interest, such as use of "a hammer".

This property is a strong shortcut of the more fully developed path from E7 Activity through *P16 used specific object*, E70 Thing, *P2 has type*, to E55 Type

Examples:

- The English archers' activity in the Battle of Agincourt (E7) *used object of type* long bow (E55). (Curry, 2015)

In first-order logic:

$P125(x,y) \Rightarrow E7(x)$

$P125(x,y) \Rightarrow E55(y)$

$P125(x,y) \Leftrightarrow (\exists z) [E70(z) \wedge P16(x,z) \wedge P2(z,y)]$

OLD

### **P125 used object of type (was type of object used in)**

Domain:

E7 Activity

Range:

E55 Type

Superproperty of:

E7 Activity. P32 used general technique (was technique of): E55 Type

Quantification:

many to many (0,n:0,n)

Scope note:

This property associates an instance of E7 Activity to an instance of E55 Type, which classifies an instance of E70 Thing used in an instance of E7 Activity, when the specific instance is either unknown or not of interest, such as use of "a hammer".

This property is a shortcut of the more fully developed path from E7 Activity through *P16 used specific object*, E70 Thing, *P2 has type*, to E55 Type

Examples:

- The English archers' activity in the Battle of Agincourt (E7) *used object of type* long bow (E55). (Curry, 2015)

In first-order logic:

$$P125(x,y) \Rightarrow E7(x)$$

$$P125(x,y) \Rightarrow E55(y)$$

$$P125(x,y) \Leftrightarrow (\exists z) [E70(z) \wedge P16(x,z) \wedge P2(z,y)]$$

*P161 has spatial projection (is spatial projection of)*

NEW

### **P161 has spatial projection (is spatial projection of)**

Domain:

E92 Spacetime Volume

Range:

E53 Place

Quantification:

many to many, necessary, dependent (1,n:0,n)

Scope note:

This property associates an instance of E92 Spacetime Volume with an instance of E53 Place that is the result of the spatial projection of the instance of the E92 Spacetime Volume on a reference space.

In general, there can be more than one useful reference space (for reference space see *P156 occupies* and *P157 is at rest relative to*) to describe the spatial projection of a spacetime volume, for example, in describing a sea battle, the difference between the battle ship and the seafloor as reference spaces. Thus, it can be seen that the projection is not unique.

The spatial projection is the actual spatial coverage of a spacetime volume, which normally has fuzzy boundaries except for instances of E92 Spacetime Volume which are geometrically defined in the same reference system as the range of this property are an exception to this and do not have fuzzy boundaries. Modelling explicitly fuzzy spatial projections serves therefore as a common topological reference of different spatial approximations rather than absolute geometric determination, for instance for relating outer or inner spatial boundaries for the respective spacetime volumes.

The spatial projection is unique with respect to the reference system. For instance, there is exactly one spatial projection of Lord Nelson's dying relative to the ship HMS Victory, i.e., the location of his body relative to the ship HMS Victory at time of his death.

In case the domain of an instance of *P161 has spatial projection* is an instance of E4 Period, the spatial projection describes all areas that period was ever present at, for instance, the Roman Empire.

This property is part of the fully developed path from E18 Physical Thing through *P196 defines*, E92 Spacetime Volume, *P161 has spatial projection* to E53 Place, which in turn is implied by *P156 occupies (is occupied by)*.

This property is a part of the fully developed path from E93 Presence through *P161 has spatial projection*, E53 Place, *P89 falls within (contains)* to E53 Place

Example:

- The Roman Empire (E4) *has spatial projection* all areas ever claimed by Rome (E53). (Clare & Edwards, 1992)

In first-order logic:

$$P161(x,y) \Rightarrow E92(x)$$

$$P161(x,y) \Rightarrow E53(y)$$

$$(\exists u) [E92(x) \wedge P157(x,u) \wedge E53(y) \wedge E53(z) \wedge E18(u) \wedge P157(y,u) \wedge P157(z,u) \wedge P161(x,y) \wedge P161(x,z) ] \Rightarrow (z = y)$$

$$P161(x,y) \wedge E4(x) \Rightarrow P7(x,y)$$

OLD

### **P161 has spatial projection (is spatial projection of)**

Domain:

E92 Spacetime Volume

Range:

E53 Place

Quantification:

one to many, necessary, dependent (1,n:0,n)

Scope note:

This property associates an instance of E92 Spacetime Volume with an instance of E53 Place that is the result of the spatial projection of the instance of the E92 Spacetime Volume on a reference space.

In general, there can be more than one useful reference space (for reference space see *P156 occupies* and *P157 is at rest relative to*) to describe the spatial projection of a spacetime volume, for example, in describing a sea battle, the difference between the battle ship and the seafloor as reference spaces. Thus, it can be seen that the projection is not unique.

The spatial projection is the actual spatial coverage of a spacetime volume, which normally has fuzzy boundaries except for instances of E92 Spacetime Volume which are geometrically defined in the same reference system as the range of this property are an exception to this and do not have fuzzy boundaries. Modelling explicitly fuzzy spatial projections serves therefore as a common topological reference of different spatial approximations rather than absolute geometric determination, for instance for relating outer or inner spatial boundaries for the respective spacetime volumes.

The spatial projection is unique with respect to the reference system. For instance, there is exactly one spatial projection of Lord Nelson's dying relative to the ship HMS Victory, i.e., the location of his body relative to the ship HMS Victory at time of his death.

In case the domain of an instance of *P161 has spatial projection* is an instance of E4 Period, the spatial projection describes all areas that period was ever present at, for instance, the Roman Empire.

This property is part of the fully developed path from E18 Physical Thing through *P196 defines*, E92 Spacetime Volume, *P161 has spatial projection* to E53 Place, which in turn is implied by *P156 occupies (is occupied by)*.

Example:

- The Roman Empire (E4) *has spatial projection* all areas ever claimed by Rome (E53). (Clare & Edwards, 1992)

In first-order logic:

$P161(x,y) \Rightarrow E92(x)$

$P161(x,y) \Rightarrow E53(y)$

$(\exists u) [E92(x) \wedge P157(x,u) \wedge E53(y) \wedge E53(z) \wedge E18(u) \wedge P157(y,u) \wedge P157(z,u) \wedge P161(x,y) \wedge P161(x,z)] \Rightarrow (z = y)$

$P161(x,y) \wedge E4(x) \Rightarrow P7(x,y)$

*P167 was within (includes)*

NEW

**P167 was within (includes)**

Domain:

E93 Presence

Range:

E53 Place

Quantification:

many to many, necessary (1,n:0,n)

Scope note:

This property associates an instance of E93 Presence with an instance of E53 Place that geometrically includes the spatial projection of the respective instance of E93 Presence. Besides others, this property may be used to state in which space an object has been for some known time, such as a room of a castle or in a drawer. It may also be used to describe a confinement of the spatial extent of some realm during a known time-span. This property is a shortcut of the more fully developed path from E7 Activity through *P16 used specific object*, E70 Thing, *P2 has type*, to E55 Type

This property is a strong shortcut of the more fully developed path from E93 Presence through *P161 has spatial projection*, E53 Place, *P89 falls within (contains)* to E53 Place.

Examples:

- Johann Joachim Winckelmann's whereabouts in December 1755 (E93) *was within* Rome (E53). (Leppmann, 1970)
- Johann Joachim Winckelmann's whereabouts from 19<sup>th</sup> November 1755 until 9<sup>th</sup> April 1768 (E93) *was within* Italy (E53). (Leppmann, 1970)

In first-order logic:

$$\begin{aligned} P167(x,y) &\Rightarrow E93(x) \\ P167(x,y) &\Rightarrow E53(y) \\ P167(x,y) &\Leftrightarrow (\exists z) [E53(z) \wedge P161(x,z) \wedge P89(z,y)] \end{aligned}$$

OLD

**P167 was within (includes)**

Domain:

E93 Presence

Range:

E53 Place

Quantification:

many to many, necessary (1,n:0,n)

Scope note:

This property associates an instance of E93 Presence with an instance of E53 Place that geometrically includes the spatial projection of the respective instance of E93 Presence. Besides others, this property may be used to state in which space an object has been for some known time, such as a room of a castle or in a drawer. It may also be used to describe a confinement of the spatial extent of some realm during a known time-span. This property is a shortcut of the more fully developed path from E7 Activity through *P16 used specific object*, E70 Thing, *P2 has type*, to E55 Type

This property is a shortcut of the more fully developed path from E93 Presence through *P161 has spatial projection*, E53 Place, *P89 falls within (contains)* to E53 Place.

Examples:

- Johann Joachim Winckelmann's whereabouts in December 1755 (E93) *was within* Rome (E53). (Leppmann, 1970)
- Johann Joachim Winckelmann's whereabouts from 19<sup>th</sup> November 1755 until 9<sup>th</sup> April 1768 (E93) *was within* Italy (E53). (Leppmann, 1970)

In first-order logic:

$$\begin{aligned} P167(x,y) &\Rightarrow E93(x) \\ P167(x,y) &\Rightarrow E53(y) \\ P167(x,y) &\Leftrightarrow (\exists z) [E53(z) \wedge P161(x,z) \wedge P89(z,y)] \end{aligned}$$

*P168 place is defined by (defines place)*

NEW

**P168 place is defined by (defines place)**

Domain:

E53 Place

Range:

E94 Space Primitive

Subproperty of:

E1 CRM Entity. P1 is identified by: E41 Appellation

Quantification:

one to many, dependent (0,n:1,1)

Scope note:

This property associates an instance of E53 Place with an instance of E94 Space Primitive that defines it. Syntactic variants or use of different scripts may result in multiple instances of E94 Space Primitive defining exactly the same place. Transformations between different reference systems always result in new definitions of places approximating each other and not in alternative definitions.

This property is a part of the fully developed path from E53 Place, *P89 falls within*, E53 Place, *P168 place is defined by* to E94 Space Primitive through a declarative Place that is not explicitly documented, to a Space Primitive: declarative places are defined in CRMgeo (Doerr and Hiebel 2013).

This property is a part of the fully developed path from E53 Place, *P89i contains*, E53 Place, *P168 place is defined by* to E94 Space Primitive.

Examples:

- The centroid from <https://sws.geonames.org/735927> (E53) *place is defined by* 40°31'17.9"N 21°15'48.3"E (E94). [A single point for approximating the centre of the city of Kastoria, Greece]
- Martin's coordinates for Kastoria (E53) *place is defined by* 40°30'23"N 21°14'53"E, 40°31'40"N 21°16'43"E (E94). [A square covering the built settlement structure of Kastoria, Greece]
- Martin's centroid for Kastoria (E53) *place is defined by* 40°31'01.5"N 21°15'48"E (E94). [A point in the lake of Kastoria in the centre of the area covered by the city]
- The position measured by Alexander von Humboldt for the Plaza Mayor in Cumaná, Sucre, Venezuela 1799-1800AD (E53) *place is defined by* 10°27'52"N 66°30'02"W (E94). [West of the Observatory of Paris = 64°09'51"W of Greenwich, actually 1,1km east of today's Plaza Andrés Bello of Cumaná] (Humboldt, 1859)

In first-order logic:

$P168(x,y) \Rightarrow E53(x)$

$P168(x,y) \Rightarrow E94(y)$

OLD

### **P168 place is defined by (defines place)**

Domain:

E53 Place

Range:

E94 Space Primitive

Subproperty of:

E1 CRM Entity. P1 is identified by: E41 Appellation

Quantification:

one to many, dependent (0,n:1,1)

Scope note:

This property associates an instance of E53 Place with an instance of E94 Space Primitive that defines it. Syntactic variants or use of different scripts may result in multiple instances of E94 Space Primitive defining exactly the same place. Transformations between different reference systems always result in new definitions of places approximating each other and not in alternative definitions.

Examples:

- The centroid from <https://sws.geonames.org/735927> (E53) place *is defined by* 40°31'17.9"N 21°15'48.3"E (E94). [A single point for approximating the centre of the city of Kastoria, Greece]
- Martin's coordinates for Kastoria (E53) place *is defined by* 40°30'23"N 21°14'53"E, 40°31'40"N 21°16'43"E (E94). [A square covering the built settlement structure of Kastoria, Greece]
- Martin's centroid for Kastoria (E53) place *is defined by* 40°31'01.5"N 21°15'48"E (E94). [A point in the lake of Kastoria in the centre of the area covered by the city]
- The position measured by Alexander von Humboldt for the Plaza Mayor in Cumaná, Sucre, Venezuela 1799-1800AD (E53) *place is defined by* 10°27'52"N 66°30'02"W (E94). [West of the Observatory of Paris = 64°09'51"W of Greenwich, actually 1,1km east of today's Plaza Andrés Bello of Cumaná] (Humboldt, 1859)

In first-order logic:

$P168(x,y) \Rightarrow E53(x)$

$P168(x,y) \Rightarrow E94(y)$

*P171 at some place within*

NEW

**P171 at some place within**

Domain:

E53 Place

Range:

E94 Space Primitive

Quantification:

many to many (0,n:0,n)

Scope note:

This property describes the maximum spatial extent within which an instance of E53 Place falls. Since instances of E53 Places may not have precisely known spatial extents, the CIDOC CRM supports statements about maximum spatial extents of instances of E53 Place. This property allows an instance of E53 Place's maximum spatial extent (i.e., its outer boundary) to be assigned an instance of E94 Space Primitive value.

This property is a strong shortcut of the fully developed path from E53 Place, *P89 falls within*, E53 Place, *P168 place is defined by* to E94 Space Primitive through a declarative Place that is not



explicitly documented, to a Space Primitive: declarative places are defined in CRMgeo (Doerr and Hiebel 2013).

Examples:

- The spatial extent of the Acropolis of Athens (E53) *at some place within* POLYGON ((37.969172 23.720787, 37.973122 23.721495 37.972741 23.728994, 37.969299 23.729735, 37.969172 23.720787)) (E94).

In first-order logic:

$$\begin{aligned} P171(x,y) &\Rightarrow E53(x) \\ P171(x,y) &\Rightarrow E94(y) \\ P171(x,y) &\Leftrightarrow (\exists z) [E53(z) \wedge P89(x,z) \wedge P168(z,y)] \end{aligned}$$

OLD

### **P171 at some place within**

Domain:

E53 Place

Range:

E94 Space Primitive

Quantification:

many to many (0,n:0,n)

Scope note:

This property describes the maximum spatial extent within which an instance of E53 Place falls. Since instances of E53 Places may not have precisely known spatial extents, the CIDOC CRM supports statements about maximum spatial extents of instances of E53 Place. This property allows an instance of E53 Place's maximum spatial extent (i.e., its outer boundary) to be assigned an instance of E94 Space Primitive value.

This property is a shortcut of the fully developed path from E53 Place, *P89 falls within*, E53 Place, *P168 place is defined by* to E94 Space Primitive through a declarative Place that is not explicitly documented, to a Space Primitive: declarative places are defined in CRMgeo (Doerr and Hiebel 2013).

Examples:

- The spatial extent of the Acropolis of Athens (E53) *at some place within* POLYGON ((37.969172 23.720787, 37.973122 23.721495 37.972741 23.728994, 37.969299 23.729735, 37.969172 23.720787)) (E94).

In first-order logic:

$$\begin{aligned} P171(x,y) &\Rightarrow E53(x) \\ P171(x,y) &\Rightarrow E94(y) \\ P171(x,y) &\Leftrightarrow (\exists z) [E53(z) \wedge P89(x,z) \wedge P168(z,y)] \end{aligned}$$

*P172 contains*

NEW

**P172 contains**

Domain:

E53 Place

Range:

E94 Space Primitive

Quantification:

many to many (0,n:0,n)

Scope note:

This property describes a minimum spatial extent which is contained within an instance of E53 Place. Since instances of E53 Place may not have precisely known spatial extents, the CIDOC CRM supports statements about minimum spatial extents of instances of E53 Place. This property allows an instance of E53 Places's minimum spatial extent (i.e., its inner boundary or a point being within a Place) to be assigned an instance of E94 Space Primitive value.

This property is a strong shortcut of the fully developed path from E53 Place, *P89i contains*, E53 Place, *P168 place is defined by* to E94 Space Primitive.

Examples:

- The spatial extent of the Acropolis of Athens (E53) *contains* POINT (37.971431 23.725947) (E94).

In first-order logic:

$P172(x,y) \Rightarrow E53(x)$   
 $P172(x,y) \Rightarrow E94(y)$   
 $P172(x,y) \Leftrightarrow (\exists z) [E53(z) \wedge P89i(x,z) \wedge P168(z,y)]$

OLD

**P172 contains**

Domain:

E53 Place

Range:

E94 Space Primitive

Quantification:

many to many (0,n:0,n)

Scope note:

This property describes a minimum spatial extent which is contained within an instance of E53 Place. Since instances of E53 Place may not have precisely known spatial extents, the CIDOC CRM supports statements about minimum spatial extents of instances of E53 Place. This property

allows an instance of E53 Places's minimum spatial extent (i.e., its inner boundary or a point being within a Place) to be assigned an instance of E94 Space Primitive value.

This property is a shortcut of the fully developed path from E53 Place, *P89i contains*, E53 Place, *P168 place is defined by* to E94 Space Primitive.

Examples:

- The spatial extent of the Acropolis of Athens (E53) *contains* POINT (37.971431 23.725947) (E94).

In first-order logic:

$$\begin{aligned} P172(x,y) &\Rightarrow E53(x) \\ P172(x,y) &\Rightarrow E94(y) \\ P172(x,y) &\Leftrightarrow (\exists z) [E53(z) \wedge P89i(x,z) \wedge P168(z,y)] \end{aligned}$$

*P195 was a presence of (had presence)*

NEW

**P195 was a presence of (had presence)**

Domain:

E93 Presence

Range:

E18 Physical Thing

Quantification:

many to one, necessary (1,1:0,n)

Scope note:

This property associates an instance of E93 Presence with the instance of E18 Physical Thing of which it represents a temporal restriction (i.e. a time-slice) of the thing's trajectory through spacetime. In other words, it describes where the instance of E18 Physical Thing was or moved around within a given time-span. Instantiating this property constitutes a necessary part of the identity of the respective instance of E93 Presence.

This property is a strong shortcut of the fully developed path from E18 Physical Thing through *P196 defines*, E92 Spacetime Volume, *P166 was a presence of (had presence)* to E93 Presence.

This property is a part of the fully developed path from E18 Physical Thing through *P196 defines*, E92 Spacetime Volume, *P166 was a presence of (had presence)* to E93 Presence.

Examples:

- Johann Joachim Winckelmann's whereabouts in December 1755 (E93) *was a presence of* Johann Joachim Winckelmann (E21). (Wiencke, 1998)
- Johann Joachim Winckelmann's whereabouts from 19<sup>th</sup> November 1755 until 9<sup>th</sup> April 1768 (E93) *was a presence of* Johann Joachim Winckelmann (E21). (Wiencke, 1998)

In first-order logic:

$P195(x,y) \Rightarrow E93(x)$   
 $P195(x,y) \Rightarrow E18(y)$   
 $P195(x,y) \Leftrightarrow (\exists z)[E92(z) \wedge P166(z,x) \wedge P196i(z,y)]$

OLD

**P195 was a presence of (had presence)**

Domain:

E93 Presence

Range:

E18 Physical Thing

Quantification:

many to one, necessary (1,1:0,n)

Scope note:

This property associates an instance of E93 Presence with the instance of E18 Physical Thing of which it represents a temporal restriction (i.e. a time-slice) of the thing's trajectory through spacetime. In other words, it describes where the instance of E18 Physical Thing was or moved around within a given time-span. Instantiating this property constitutes a necessary part of the identity of the respective instance of E93 Presence.

This property is a shortcut of the fully developed path from E18 Physical Thing through *P196 defines*, E92 Spacetime Volume, *P166 was a presence of (had presence)* to E93 Presence.

Examples:

- Johann Joachim Winckelmann's whereabouts in December 1755 (E93) *was a presence of* Johann Joachim Winckelmann (E21). (Wiencke, 1998)
- Johann Joachim Winckelmann's whereabouts from 19<sup>th</sup> November 1755 until 9<sup>th</sup> April 1768 (E93) *was a presence of* Johann Joachim Winckelmann (E21). (Wiencke, 1998)

In first-order logic:

$P195(x,y) \Rightarrow E93(x)$   
 $P195(x,y) \Rightarrow E18(y)$   
 $P195(x,y) \Leftrightarrow (\exists z)[E92(z) \wedge P166(z,x) \wedge P196i(z,y)]$

*P199 represents instance of type*

NEW

**P199 represents instance of type**

Domain:

E36 Visual Item

Range:

E55 Type

Superproperty of:

E36 Visual Item. P138 represents (has representation): E1 CRM Entity

Quantification:

many to many (0,n:0,n)

Scope note:

This property establishes the relationship between an instance of E36 Visual Item and an instance of E55 Type that characterises the thing depicted. This property is used when the identity of the thing depicted is unknown or unrecorded, but is clearly a particular thing of that type. If the instance of E36 Visual Item directly depicts the concept of the E55 Type rather than an instance of a thing of that type, then this should be represented using E36 Visual Item *P138 represents* E55 Type.

This property is a strong shortcut of the more fully developed path from E36 Visual Item through *P138 represents*, E1 CRM Entity, *P2 has type* to E55 Type.

Examples:

- The visual content of photograph gri\_2012\_m\_2\_b001\_f001\_d01\_e005\_0148 (E36) *represents instance of type* automobile (E55)  
[Reference: <https://www.getty.edu/research/collections/object/10062J>]
- The top right image on page 87 in the book ‘Pharaoh’s Birds’ by John Miles (E36) *represents instance of type* hoopoe (Upupa epops) (E55).  
[This image is a reproduction of a photograph. The same book shows at the top of page 35 an image representing an unnamed ancient Egyptian relief depicting a hoopoe and other ‘Birds of the Marshes’. In contrast to the photograph, the latter image of the ancient Egyptian depiction shows intentionally typical rather than individual characteristics of the respective species, and should therefore be associated with the property *P138 represents* with the species name hoopoe (Upupa epops)]. (Miles, 1998)
- The visual content of Monet’s painting from 1868-1869 held by Musée d’Orsay, Paris, under inventory number RF 1984 164 (E36) *represents instance of type* magpie (Pica pica) (E55).  
[The editors give this example under the assumption that Claude Monet, as impressionist, created the painting following a real impression of a particular magpie. It was clearly not meant as a prototypical representation of this bird] (Musée d’Orsay, 2020)
- The top image on page 44 in the book ‘Wildblumen Kretas’ by Vangelis Papiomytoglou (E36) *represents instance of type* Cistus creticus L. (E55). [This image is a reproduction of a photograph. The plant produces an aromatic resin that has been exported from Crete to Egypt and other areas since the Bronze Age] (Papiomytoglou, 2006)

In first-order logic:

$$\begin{aligned}
 P199(x,y) &\Rightarrow E36(x) \\
 P199(x,y) &\Rightarrow E55(y) \\
 P199(x,y) &\Leftarrow (\exists z)[E1(z) \wedge P138(x,z) \wedge P2(z,y)]
 \end{aligned}$$

OLD

**P199 represents instance of type**

Domain:

E36 Visual Item

Range:

E55 Type

Superproperty of:

E36 Visual Item. P138 represents (has representation): E1 CRM Entity

Quantification:

many to many (0,n:0,n)

Scope note:

This property establishes the relationship between an instance of E36 Visual Item and an instance of E55 Type that characterises the thing depicted. This property is used when the identity of the thing depicted is unknown or unrecorded, but is clearly a particular thing of that type. If the instance of E36 Visual Item directly depicts the concept of the E55 Type rather than an instance of a thing of that type, then this should be represented using E36 Visual Item *P138 represents* E55 Type.

This property is a shortcut of the more fully developed path from E36 Visual Item through *P138 represents*, E1 CRM Entity, *P2 has type* to E55 Type.

Examples:

- The visual content of photograph gri\_2012\_m\_2\_b001\_f001\_d01\_e005\_0148 (E36) *represents instance of type* automobile (E55)  
[Reference: <https://www.getty.edu/research/collections/object/10062J>]
- The top right image on page 87 in the book ‘Pharaoh’s Birds’ by John Miles (E36) *represents instance of type* hoopoe (*Upupa epops*) (E55).  
[This image is a reproduction of a photograph. The same book shows at the top of page 35 an image representing an unnamed ancient Egyptian relief depicting a hoopoe and other ‘Birds of the Marshes’. In contrast to the photograph, the latter image of the ancient Egyptian depiction shows intentionally typical rather than individual characteristics of the respective species, and should therefore be associated with the property *P138 represents* with the species name hoopoe (*Upupa epops*)]. (Miles, 1998)
- The visual content of Monet’s painting from 1868-1869 held by Musée d’Orsay, Paris, under inventory number RF 1984 164 (E36) *represents instance of type* magpie (*Pica pica*) (E55).  
[The editors give this example under the assumption that Claude Monet, as impressionist, created the painting following a real impression of a particular magpie. It was clearly not meant as a prototypical representation of this bird] (Musée d’Orsay, 2020)
- The top image on page 44 in the book ‘Wildblumen Kretas’ by Vangelis Papiomytoglou (E36) *represents instance of type* *Cistus creticus* L. (E55). [This image is a reproduction of a photograph. The plant produces an aromatic resin that has been exported from Crete to Egypt and other areas since the Bronze Age] (Papiomytoglou, 2006)

In first-order logic:

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*TXP7 has item*

NEW

**TXP7 has item (is item of)**

Domain:

TX13 Script

Range:

TX8 Grapheme

Subproperty of:

P67 refers to (is referred to by)

Quantification:

many to many (0,n:0,n)

Scope note:

This property associates an instance of TX13 Script with an instance of TX8 Grapheme employed by this script. Different instances of TX13 Script may have some graphemes in common.

Examples:

- The Latin script (TX13) *has item* the ideal capital letter “S”.

In First Order Logic:

$TXP7(x,y) \Rightarrow TX3(x)$

$TXP7(x,y) \Rightarrow TX8(y)$

OLD

**TXP7 has item (is item of)**

Domain: TX3 Writing System

Range: TX8 Grapheme

Subproperty of P106 is composed of (forms part of)

Quantification: one to one (0,1:1,1)

Scope note: This property is used to state the (conceptual) belonging of a TX8 Grapheme to a given TX3 Writing System.

Examples:

- The Latin alphabet (TX3), used to encode the inscription (TX1) on South face of the Arch of Constantine, *has item* the grapheme <S> (TX8) used in this writing system to represent the /s/ sound.

In First Order Logic:

$TXP7(x,y) \supset TX3(x)$

$TXP7(x,y) \supset TX8(y)$

$TXP7(x,y) \supset P106(x,y)$

*TXP17 has part*

NEW

**TXP17 has part (forms part of)**

Domain:

TX12 Grapheme Sequence

Range:

TX12 Grapheme Sequence

Subproperty of:

P106 is composed of (forms part of)

Quantification:

one to many (0,n:0,1)

Scope note:

This property associates an instance of TX12 Grapheme Sequence with another instance of TX12 Grapheme Sequence appearing at a particular position of the sequence. The property can be also used by an instance of TX11 Grapheme Occurrence (subclass of TX12 Grapheme Sequence) for denoting that a grapheme occurrence has part another grapheme occurrence. Note that a grapheme occurrence may be a symbolic composite containing another grapheme occurrence, such as the minute character “e” on top of the character “u” in former German writing systems denoting the symbol for “ü”.

Examples:

- The “DIVINITATIS” grapheme sequence (TX12), corresponding to the glyph sequence of the inscription (TX1) on the Arch of Constantine, *has part* the “AT” grapheme sequence (TX12) [which appears to be damaged].

In First Order Logic:

$TXP17(x,y) \Rightarrow TX12(x)$

$TXP17(x,y) \Rightarrow TX12(y)$

$TXP17(x,y) \Rightarrow P106(x,y)$

$TXP17(x,y) \wedge TX11(x) \Rightarrow \neg TX12(y)$

*TXP18 read*

NEW

**TXP18 read (was read by):**

Domain:

TX14 Reading

Range:

TX1 Written Text

Subproperty of:

P16 used specific object (was used for)



Quantification:

many to many (0,n:0,n)

Scope note:

This property associates an instance of TX14 Reading with an instance of TX1 Written Text whose linguistic meaning was interpreted/understood through the reading process. It is a shortcut of the fully developed path from TX14 Reading through *P9 consists of*, TX5 Text Recognition, *TXP10 deciphered text*, to TX1 Written Text.

Examples:

- Reading the Greek text present on the Derveni papyrus (TX14) *read* the papyrus (TX1) [interpreted the linguistic meaning that was carried by it]

In First Order Logic:

$TXP18(x,y) \Rightarrow TX14(x)$

$TXP18(x,y) \Rightarrow TX1(y)$

$TXP18(x,y) \Rightarrow P16(x,y)$

$TXP18(x,y) \Rightarrow (\exists z) [TX5(z) \wedge P9(x,z) \wedge TXP10(z, y)]$

*TXP13 deciphered via the representation*

NEW

**TXP13 deciphered via the representation (was representation used for deciphering)**

Domain:

TX5 Text Recognition

Range:

E36 Visual Item

Subproperty of:

P16 used specific object (was used for)

Quantification:

one to one (0,1:0,n)

Scope note:

This property associates an instance of TX5 Text Recognition with an instance of E36 Visual Item, capturing the optical impression of an instance of TX1 Written Text by some mechanical method, that was used for recognizing the text without access to the original text and without an explicitly documented material copy or electronic display device that was used for the process.

If the text was actually recognized from an autoptic recognition or from a material reproduction, this property may not be used but the property “TXP10 deciphered text (was deciphered by)” should be used instead.

This property should also not be used, if the recognition of the text was actually carried out from the original text or a material copy of it together with an auxiliary instance of E36 Visual Item. In this case, the use of the auxiliary material should be documented with the more general property *P16 used specific object*.

Examples:

- The recognition of text in the Antikythera mechanism (TX5) *deciphered via the representation* produced using BTI imaging (E36).

In First Order Logic:

$TXP13(x,y) \Rightarrow TX5(x)$

$TXP13(x,y) \Rightarrow E36(y)$

$TXP13(x,y) \Rightarrow P16(x,y)$

$TXP13(x,y) \Rightarrow (\exists z) [TXP14(x,z) \wedge P138(y,z) \wedge \neg TXP10(x,z)]$

*TX3 Writing System*

NEW

### **TX3 Writing System**

Subclass of:

E29 Design or Procedure

Scope Note:

This class represents a conventional symbolic system designed to represent units of a natural language with the purpose of recording and transmitting information. A writing system consists of a set of symbols (graphemes, TX8), instantiated through physical signs of a visual or tactile nature (glyphs, TX9) representing linguistic units of any kind and the related syntactic (i.e., graphotactic) rules.

It is used to produce a TX1 Written Text during a TX2 Writing event.

Examples:

- The Latin alphabet used to encode the signs (TX1) composing the text (E33) of the inscription in Latin language occurring on the Arch of Constantine (E22).
- The Roman Latin writing system for creating public inscriptions.
- The Cypriot syllabary<sup>1</sup> used in Iron Age Cyprus for codifying the Arcado-Cypriot dialect.
- The Chinese (Han) script used by Wang Xizhi to write the manuscript *Lanting Xu* (“Orchid Pavilion Preface”).

In First Order Logic:

$TX3(x) \Rightarrow E29(x)$

Properties:

TXP6 encodes (is encoding of): E56 Language

TXP16 employs script (is employed by): TX13 Script

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<sup>1</sup> <https://www.worldswritingsystems.org/> (accessed on 2023/06/06)

OLD

### TX3 Writing System

Subclass of: E29 Design or Procedure

Superclass of:

Scope Note: This class represents conventional, symbolic system consisting of set of visible or tactile signs (graphemes, TX8) designed to represent units of a natural language with the purpose of recording and transmitting information. A complete retrieval of the transmitted messages requires a shared knowledge, between writers and readers, of the encoded language, the writing system elements and its encoding rules.

It is used to produce a TX1 Written Text during a TX2 Writing event.

Examples:

- The Latin alphabet used to encode the signs (TX1) composing the text (E33) of the inscription in Latin language occurring on the Arch of Constantine (E22).
- The Cypriot syllabary used in Iron Age Cyprus for codifying the Arcado-Cypriot dialect.
- The Chinese (Han) script used by Wang Xizhi to write the manuscript *Lanting Xu* (“Orchid Pavilion Preface”).

In First Order Logic:

$$\text{TX3}(x) \supset \text{E29}(x)$$

Properties:

TXP6 encodes (is encoding of): E33 Linguistic Object

TXP7 has item (is item of): TX8 Grapheme

Issue 510:

*Class/property deprecations:*

I8 Conviction

Subclass of: E2 Temporal Entity

Superclass of: I2 Belief

I9 Provenanced Comprehension

Scope note: This class comprises convictions by individuals or groups about the truth or not of some state of affairs.

Examples:

- My belief that Gaius Suetonius Tranquillus was deliberately lying about Nero.

In First Order Logic:

$$\text{I8}(x) \supset \text{E2}(x)$$

J11 used manifestation [D: I8 Conviction, R: F3 Manifestation]

Domain: I8 Conviction

Range: F3 Manifestation

Subproperty of:

Superproperty of:

Quantification: many to many (0,n:0,n)

Scope note: This property associates an instance of I8 Conviction with the instance of F3 Manifestation that carried the instance of F2 Expression that contained the instances of E89 Propositional Object that make up the I4 Proposition Set being embraced. It assumes that a non-contentious reading of the instance of F2 Expression has allowed the instances of E89 Propositional Object to be elicited and enumerated.

This property is a shortcut over the long path: I7 Belief adoption: *J6 adopted*: I2 Belief: *J4 that (is subject of)*: I4 Proposition Set: *P148 has component (is component of)*: E89 Propositional Object: *P148i has component (is component of)*: F1 Work: *R3 is realised in (realises)*: F2 Expression: *R4i is embodied in*: F3 Manifestation

Examples:

- My adoption of the belief that Dragendorff type 29 bowls are from the 1st Century AD (I7) *J11 used manifestation (was manifestation used by)* "Terra sigillata. Ein Beitrag zur Geschichte der griechischen und römischen Keramik", *Bonner Jahrbücher* 96 (1895), 18-155 (F3)
- Martin's citation that Nero was singing in Rome while it was burning *J11 used manifestation (was manifestation used by)* manifestation of *De Vita Caesarum* by Gaius Suetonius Tranquillus

In First Order Logic:

$J11(x,y) \supset I8(x)$   
 $J11(x,y) \supset F3(y)$

I9 Provenanced Comprehension

Subclass of: I8 Conviction

Superclass of:

Scope note: This class comprises beliefs in the correct reading or scholarly interpretation of the overt message intended by an instance of E73 Information Object ("source"), in which the interpretation of the source is formulated as a set of formal propositions or regarded to be unambiguously given in the form natural language.

An instance of I9 Provenanced Comprehension implies believing the authenticity of the respective instance of E73 Information Object relative to an explicitly stated provenance, but does not mean believing the respective propositions. Rather, the truth of the cited message is the subject of another scholarly interpretation process. It further does not pertain to arguing about hidden or cryptic meanings of a source, which is the subject of a further scholarly interpretation process.

Properties:

J8 understands (is understood by): E73 Information Object  
J9 believes in provenance (provenance is believed by): I10 Provenance Statement  
J10 reads as: I4 Proposition Set

Examples:

- My citation and belief that the extant book *De Vita Caesarum* attributed to Gaius Suetonius Tranquillus stated 121AD that Nero was singing in Rome while it was burning from July 19 in 64 AD.<sup>1</sup>

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<sup>1</sup> [https://en.wikipedia.org/wiki/The\\_Twelve\\_Caesars](https://en.wikipedia.org/wiki/The_Twelve_Caesars)

In First Order Logic:

$$I9(x) \supset I8(x)$$

J8 understands (is understood by)

Domain: I9 Provenanced Comprehension

Range: E73 Information Object

Subproperty of:

Superproperty of:

Quantification: many to one, necessary (1,1:0,n)

Scope note: This property associates an instance of I9 Provenanced Comprehension with the instance of E73 Information Object it interprets with respect to its intended overt message.

- My citation that Nero was singing in Rome while it was burning *understands* the extant book De Vita Caesarum by Gaius Suetonius Tranquillus

In First Order Logic:

$$J8(x,y) \supset I7(x)$$

$$J8(x,y) \supset E73(y)$$

J9 believes in provenance

Domain: I9 Provenanced Comprehension

Range: I10 Provenance Statement

Subproperty of:

Superproperty of:

Quantification: many to one, necessary (1,1:0,n)

Scope note: This property associates an instance of I9 Provenanced Comprehension with the instance of I10 Provenance Statement that defines the believed provenance of the instance of E73 Information Object referred to in the instance of I9 Provenanced Comprehension.

Examples:

- My citation that Nero was singing in Rome while it was burning *believes in provenance* that the content of the extant book De Vita Caesarum by Gaius Suetonius Tranquillus was published in Rome 121AD

In First Order Logic:

$$J9(x,y) \supset I9(x)$$

$$J9(x,y) \supset I10(y)$$

### J10 reads

Domain: I9 Provenanced Comprehension

Range: I4 Proposition Set

Subproperty of:

Superproperty of:

Quantification: many to one, necessary (1,1:0,n)

Scope note: This property associates an instance of I9 Provenanced Comprehension with the instance of I4 Proposition Set that formulates the interpretation.

Examples:

- My citation that Nero was singing in Rome while it was burning *reads as* “Nero, while watching Rome burn, exclaimed how beautiful it was, and sang an epic poem about the sack of Troy while playing the lyre”

In First Order Logic:

$$J9(x,y) \supset I9(x)$$

$$J9(x,y) \supset I4(y)$$

### J6 adopted [D: I7 Belief Adoption, R: I2 Belief]

Domain: I7 Belief Adoption

Range: I2 Belief

Subproperty of: P17 was motivated by (motivated)

Superproperty of:

Quantification: many to many, necessary (1,n:0,n)

Scope note: This property associates an instance of I2 Belief with the instance of I7 Belief Adoption that used it as the source of the I6 Belief Value and propositions used in the resulting new I2 Belief.

Examples:

- My adoption of the belief that Dragendorff type 29 bowls are from the 1st Century AD (I7) adopted Dragendorff’s belief that type 29 bowls are from the 1st Century AD (I2)

### J12 used (was used by) [D: I8 Conviction, R:F5 Item]

Domain: I8 Conviction

Range: F5 Item

Subproperty of:

Superproperty of:

Quantification: many to many (0,n:0,n)

Scope note: This property associates an instance of I8 Conviction with the particular instance of F5 Item that carried the instance of F2 Expression that contained the instances of E89 Propositional Object that make up the I4 Proposition Set being embraced.

This property is a shortcut over the long path: I7 Belief Adoption: J6 adopted: I2 Belief: J2i was concluded by: I5/S5 Inference Making: J1 used as premise (was premise for): E25 Human-Made Feature: O16 observed value (value was observed by): S4 Observation: O8 observed (was observed by): F5 Item

Examples:

- My adoption of the belief that Dragendorff type 29 bowls are from the 1st Century AD (I8) J12 used (was used by) The Institute of Archaeologies' copy of "Terra sigillata. Ein Beitrag zur Geschichte der griechischen und römischen Keramik", *Bonner Jahrbücher* 96 (1895), 18-155 (F5)
- Martin's citation that Nero was singing in Rome while it was burning J12 used (was used by) Martin's copy of *De Vita Caesarum* by Gaius Suetonius Tranquillus

### *Newly introduced classes*

#### Ix4 Adopted Belief

Subclass of: I2 Belief

Superclass of

Scope note: This class comprises the notion that an Actor adopted the meaning of the associated I4 Proposition Set by arguments of trust from a source created by another Actor and holds it as being true or in some way likely to be true. This source can be documented via the property *Jxx5 adopted interpretation of (has adopted interpretation)*. The used interpretation of the meaning of the source may be a belief of the adopting Actor or another one and can be documented as an instance of Ix2 Intended Meaning Belief, if this detail is relevant.

Properties: Jxx2 adopted interpretation of (has adopted interpretation) : E73 Information Object

Examples:

- Francesca Bologna's belief that Nero was at Antium when the Great Fire broke out and did not return to Rome until the fire approached his house (F. Bologna, 2021)

In First Order Logic:

$$Ix4(x) \Rightarrow I2(x)$$

#### Ix2 Intended Meaning Belief

Subclass of: I2 Belief

Superclass of:

Scope note: This class comprises beliefs of an Actor that a particular instance of I4 Proposition Set formally represents a part or all of the meaning intended by a source created by another Actor, without considering an opinion yet about its truth or trustworthiness. The belief constitutes an interpretation of the source. The respective proposition set and can be documented using the property *Jxx6 assumes meaning (is supposed meaning in)*, whereas the respective source can be documented via the property *Jxx7 about (has interpretation)*. and holds it as being true or in some way likely to be true. The used interpretation of the meaning of the source may be a belief of the adopting Actor or another one and can be documented as an instance of Ix2 Intended Meaning Belief, if this detail is relevant.

Properties: Jxx6 assumed meaning (is supposed meaning in): I4 Proposition Set

Jxx7 about (has interpretation): E73 Information Object

Examples:

- Francesca Bologna’s belief that Publius Cornelius Tacitus meant that “Nero was at Antium when the Great Fire broke out and did not return to Rome until the fire approached his house” (F. Bologna, 2021)
- Francesca Bologna’s belief that Gaius Suetonius Tranquillus meant that Nero was singing in Rome while it was burning from July 19 in 64 AD.

In First Order Logic:

$$Ix2(x) \Rightarrow I2(x)$$

Ix5 Provenance Belief

Subclass of: I2 Belief

Superclass of

Scope note: This class comprises beliefs of an Actor that a particular instance of E70 Thing, in general available to this Actor, is identical to one present in a relevant event or context of reference in the past, such as a text in a book being sufficiently identical to the one in the claimed author’s original manuscript or edition in order to be used by the Actor for citation. Other examples are the provenance of archaeological objects in collections, which may pertain to the claimed excavation spot or to the inferred context of their creation.

The term “in general available” means that the thing is either physically in the hands of the actor or that the actor or an actor of their trust has the principled ability to get access to the thing. In case that only information objects exist describing the proper thing of interest, such as a photo of a lost archaeological object, an instance of Ix5 Provenance Belief should be based on arguments including references to provenance beliefs about descriptions, representations and the described things.

A formal description about the assumed provenance can be documented via the property *Jxx8 that*. Note that, depending on the intended argumentation about the respective instance of E70 Thing, different aspects of provenance may be described about the same instance of E70 Thing.

Properties: Jxx8 that (is subject of); I10 Provenance Statement

Examples:

- Francesca Bologna’s belief about the authenticity of Tacitus, Publius Cornelius. The Annals. Book 15.
- Ernst Pernicka et al. believe that the Nebra Sky Disc dates to the Early Bronze Age (Pernicka et al. 2020)

In First Order Logic:

$$Ix5(x) \Rightarrow I2(x)$$

Ix3 Provenance Assessment

Subclass of: I1 Argumentation

Superclass of:



Scope note: This class comprises activities of arguing and concluding about the likely provenance of instances of E70 Thing existing at the time of this assessment. These activities may further be about the provenance of things referred to or represented by existing information objects, and subsequent references.

Properties: Jxx1 concluded provenance: Ix5 Provenance Belief

Examples:

- The assessment by Ernst Pernicka et al. about the provenance of the Nebra Sky Disc (Pernicka et al. 2020)

In First Order Logic:

$$Ix3(x) \Rightarrow I1(x)$$

### Ix1 Meaning Comprehension

Subclass of: I1 Argumentation

Superclass of:

Scope note: This class comprises processes of interpreting the intended meaning of parts or the whole of the content of an instance of E73 Information Object as propositions. Such interpretations may include the disambiguation of the meaning of words and expressions, expanding abbreviations, resolving named entities, references and co-references, and complementing missing text parts, without however arguing about the actual truth of the information.

In principle, any use of an information object pertaining to its meaning implies an instance of Ix1 Meaning Comprehension. However, in practical applications, texts in natural language are often clear enough so that no explicit explanation of the interpretation is needed for the user. In such cases, there is no need to create explicit instances of Ix1 Meaning Comprehension, but the adopted belief may directly be linked via *Jxx2 adopted interpretation of (has adopted interpretation)*, or the instance of Ix1 Meaning Comprehension may be made implicit to an instance of I7 Belief Adoption by multiple instantiation.

Explicit documentation of instances of Ix1 Meaning Comprehension are useful, if the interpretations are not obvious and if competing arguments about them exist.

Properties: Jxx10 interpreted meaning of: E73 Information Object

Jxx11 interpreted meaning as: Ix2 Intended Meaning Belief

Examples:

- My understanding of the statements about Emperor Nero's whereabouts in Rome while it was burning from July 19 in 64 AD <sup>1</sup> in the extant book *De Vita Caesarum* attributed to Gaius Suetonius Tranquillus.

In First Order Logic:

$$Ix1(x) \Rightarrow I1(x)$$

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<sup>1</sup> [https://en.wikipedia.org/wiki/The\\_Twelve\\_Caesars](https://en.wikipedia.org/wiki/The_Twelve_Caesars)

### *Newly introduced properties*

Jxx5 adopted interpretation [D: I7 Belief Adoption, R: Ix4 Adopted Belief]

#### **Jxx5 adopted interpretation (was concluded by)**

Domain: I7 Belief Adoption

Range: Ix4 Adopted Belief

Subproperty of: J2 concluded that (was concluded by)

Quantification: many to many, necessary, dependent (1,n:1,n)

Scope Note: This property associates an instance of I7 Belief Adoption with the instance of Ix4 Adopted Belief that was established and possibly selected from the interpretation of the source or sources referred to by the property *Jxx2 adopted interpretation of*. This property implies a relation of trust in the reliability of the sources. The actual believed content, i.e., propositions about some past reality and adopted from the source, should be documented using the property *J4 that*.

Examples:

- Francesca Bologna's adoption of Tacitus' belief where Emperor Nero was when the Great Fire started *Jxx5 adopted interpretation* Francesca Bologna's belief that Nero was at Antium when the Great Fire broke out and did not return to Rome until the fire approached his house (F. Bologna, 2021)

In First Order Logic:

$$Jxx5(x,y) \Rightarrow I7(x)$$

$$Jxx5(x,y) \Rightarrow Ix4(y)$$

$$Jxx5(x,y) \Rightarrow J2(x,y)$$

$$Jxx5(x,y) \Leftarrow (\exists uvw) [E73(u) \wedge \mathbf{J7(x,u)} \wedge Ix2(v) \wedge Jxx3(x,v) \wedge I4(w) \wedge J4(y,w) \wedge Jxx7(u,v) \wedge Jxx6(v,w)]$$

Jxx2 adopted interpretation of [D: Ix4 Adopted Belief, E73 Information Object]

#### **Jxx2 adopted interpretation of (has adopted interpretation)**

Domain: Ix4 Adopted Belief

Range: E73 Information Object

Quantification: many to many, necessary (1,n:0,n)

Scope Note: This property associates an instance of Ix4 Adopted Belief with a source or sources of interpretation from which the belief was established and possibly selected. In some cases of scholarly arguments, multiple sources referring to a common topic may have been interpreted in order to form a particular belief about the topic referred to.

Examples:

- Francesca Bologna's belief that "Nero was at Antium when the Great Fire broke out and did not return to Rome until the fire approached his house" *Jxx2 adopted interpretation of* Tacitus, Publius Cornelius. The Annals. Book 15 [15.16] (F. Bologna, 2021)

In First Order Logic:

$$Jxx2(x,y) \Rightarrow Ix4(x)$$

$$Jxx2(x,y) \Rightarrow E73(y)$$

Jxx3 assumed meaning [D:I7 Belief Adoption, R: Ix2 Intended Meaning Belief]

**Jxx3 assumed meaning (was assumed by)**

Domain: I7 Belief Adoption

Range: Ix2 Intended Meaning Belief

Subproperty of: J1 used as premise (was premise for)

Quantification: many to many, necessary (1,n:0,n)

Scope Note: This property associates an instance of I7 Belief Adoption with an instance of Ix2 Intended Meaning Belief about a meaning believed to be expressed in the source or sources referred to by the property Jxx2 adopted interpretation of.

Examples:

- Francesca Bologna’s adoption of Tacitus’ belief where Emperor Nero was when the Great Fire started *Jxx3 assumed meaning* Francesca Bologna’s belief that Publius Cornelius Tacitus meant that “Nero was at Antium when the Great Fire broke out and did not return to Rome until the fire approached his house” (F. Bologna, 2021)

In First Order Logic:

$Jxx3(x,y) \Rightarrow I7(x)$

$Jxx3(x,y) \Rightarrow Ix2(y)$

$Jxx3(x,y) \Rightarrow J1(x,y)$

Jxx6 assumed meaning [D: Ix2 Intended Meaning Belief, I4 Proposition Set]

**Jxx6 assumed meaning (is supposed meaning in)**

Domain: Ix2 Intended Meaning Belief

Range: I4 Proposition Set

Quantification: many to many, necessary (1,n:0,n)

Scope Note: This property associates an instance of Ix2 Intended Meaning Belief with the instance of I4 Proposition Set that represents the meaning assumed by the holder of the belief to have been intended by the respective source. The latter source can be documented with the property *Jxx7 about (has interpretation)*.

Examples:

- Francesca Bologna’s belief that Publius Cornelius Tacitus meant that “Nero was at Antium when the Great Fire broke out and did not return to Rome until the fire approached his house” (Ix2) *Jxx6 assumed meaning*  
{Nero in July 19, 64 AD (E93 Presence)  
P164 is temporally specified by: July 19, 64 AD (E52 Timespan)  
P195 was a presence of: Nero Claudius Caesar Drusus Germanicus (E21 Person)  
P167 was within Antium in 64 AD, Italy (E53 Place)  
P133 is spatiotemporally separated from: The Great Fire of Rome (E5 Event)  
P1 is identified by: incendium magnum Romae (E41 Appellation)  
P4 has timespan: July 19-27, 64 AD (E52 Timespan)  
P7 took place at : Rome in 64AD, Italy (E53 Place)  
} (I4) (F. Bologna, 2021)

- Francesca Bologna's belief that Gaius Suetonius Tranquillus meant that Nero was singing in Rome while it was burning from July 19 in 64 AD *Jxx6 assumed meaning*
    - {Nero July 19, 64 AD (E93 Presence)
    - P164 is temporally specified by: July 19, 64 AD (E52 Timespan)
    - P195 was a presence of: Nero Claudius Caesar Drusus Germanicus (E21 Person)
    - P167 was within Rome in 64AD, Italy (E53 Place)
      - P10 falls within (contains): Nero Singing (E7 Activity)
        - P2 has type: Singing (E55 Type)
        - P14 carried out by: Nero Claudius Caesar Drusus Germanicus (E21)
        - P4 has timespan: July 19, 64 AD (E52 Timespan)
        - P7 took place at: Rome in 64AD, Italy (E53 Place)
    - P132 spatiotemporally overlaps with: The Great Fire of Rome (E5 Event)
      - P1 is identified by: incendium magnum Romae (E41 Appellation)
      - P4 has timespan: July 19-27, 64 AD (E52 Timespan)
      - P7 took place at: Rome in 64AD, Italy (E53 Place)
- }(I4) (F. Bologna, 2021)

In First Order Logic:

$$Jxx6(x,y) \Rightarrow Ix2(x)$$

$$Jxx6(x,y) \Rightarrow I4(y)$$

*Jxx7* about [D: *Ix2* Intended Meaning, R; E73 Information Object]

***Jxx7* about (has interpretation)**

Domain: *Ix2* Intended Meaning Belief

Range: E73 Information Object

Subproperty of:

Superproperty of:

Quantification: many to many, necessary (1,n:0,n)

Scope note: This property associates an instance of *Ix2* Intended Meaning Belief with the instance of E73 Information Object that was a source of, or evidence for, the interpretation of its intended meaning. If sources are fragmentary about, or complementary to, a specific topic, more than one source may have been used.

Examples:

- Francesca Bologna's belief that Gaius Suetonius Tranquillus meant that Nero was singing in Rome while it was burning from July 19 in 64 AD *about* the extant book *De Vita Caesarum* attributed to Gaius Suetonius Tranquillus.

In First Order Logic:

$$Jxx7(x,y) \Rightarrow Ix2(x)$$

$$Jxx7(x,y) \Rightarrow E73(y)$$

*Jxx4* assumed provenance [D: I7 Belief Adoption, R: Ix5 Provenance Belief]

***Jxx4* assumed provenance (was assumed by)**

Domain: I7 Belief Adoption

Range: Ix5 Provenance Belief

Subproperty of: J1 used as premise (was premise for)

Quantification: many to many, necessary (1,n:0,n)

Scope Note: This property associates an instance of I7 Belief Adoption with an instance of Ix5 Provenance Belief about the source or sources referred to by the property Jxx2 adopted interpretation of, which justifies the conviction that the trusted and adopted content of the source, or its copy at hand, is actually identical, or sufficiently close, to the assumed original and its context of creation.

Examples:

- Francesca Bologna's adoption of Tacitus' belief where Emperor Nero was when the Great Fire started *Jxx4 assumed provenance* Francesca Bologna's belief about the authenticity of Tacitus, Publius Cornelius. The Annals. Book 15.

In First Order Logic:

$$Jxx4(x,y) \Rightarrow I7(x)$$

$$Jxx4(x,y) \Rightarrow Ix5(y)$$

$$Jxx4(x,y) \Rightarrow J1(x,y)$$

$$Jxx4(x,y) \Leftarrow (\exists uv) [E73(u) \wedge J7(x,u) \wedge I10(v) \wedge Jxx9(v,u) \wedge Jxx8(y,v)]$$

[Jxx8 that \[D: Ix5 Provenance Belief, R: I10 Provenance Statement\]](#)

**Jxx8 that (is subject of)**

Domain: Ix5 Provenance Belief

Range: I10 Provenance Statement

Subproperty of: I2 Belief. J4 that (is subject of): I4 Proposition Set

Superproperty of:

Quantification: many to many, necessary (1,n:0,n)

Scope note: This property associates an instance of Ix5 Provenance Belief with the instance of I10 Provenance Statement that holds an opinion about it.

Examples:

- Francesca Bologna's belief about the authenticity of Tacitus, Publius Cornelius. The Annals. Book 15 *that* the copy of Tacitus, Publius Cornelius. The Annals. Book 15 [15.16] at hands of Francesca Bologna from the British Museum in 2021 represents a text written by the ancient Roman historian Publius Cornelius Tacitus.
- The belief of Ernst Pernicka et al. that the Nebra Sky Disc Dates to the Early Bronze Age *that* "the Nebra Sky Disc dates to the Early Bronze Age" (Pernicka et al. 2020)

In First Order Logic:

$$Jxx8(x,y) \Rightarrow Ix5(x)$$

$$Jxx8(x,y) \Rightarrow I10(y)$$

$$Jxx8(x,y) \Rightarrow J4(x,y)$$

Jxx9 is about the provenance of [D: I10 Provenance Statement, R: E70 Thing]

**Jxx9 is about the provenance of (has provenance claim)**

Domain: I10 Provenance Statement

Range: E70 Thing

Subproperty of: E89 Propositional Object. P129 is about (is subject of): E1 CRM Entity

Superproperty of:

Quantification: many to many, necessary (1,n:0,n)

Scope note: This property associates an instance of I10 Provenance Statement with an instance of E70 Thing the provenance of which this statement describes.

Examples:

- The statement: “The exemplar of The Merchant of Venice, Quarto 1 (1600) owned by The British Library, shelf number BL C.34.k.22 was published 1600 AD by Thomas Heyes” *is about provenance of* The exemplar of The Merchant of Venice, Quarto 1 (1600) owned by The British Library, shelf number BL C.34.k.22

In First Order Logic:

$Jxx9(x,y) \Rightarrow I10(x)$   
 $Jxx9(x,y) \Rightarrow E70(y)$   
 $Jxx9(x,y) \Rightarrow P129(x,y)$

Jxx1 concluded provenance [D: Ix3 Provenance Assessment, R: Ix5 Provenance Belief]

**Jxx1 concluded provenance (was assessed by)**

Domain: Ix3 Provenance Assessment

Range: Ix5 Provenance Belief

Subproperty of: J2 concluded that (was concluded by)

Quantification: many to many, necessary (1,n:0,n)

Scope Note: This property associates an instance of Ix3 Provenance Assessment with an instance of Ix5 Provenance Belief that constitutes the conclusion of the assessment. An instance of Ix3 Provenance Assessment may conclude more than one instance of Ix5 Provenance Belief, typically about different objects considered in the same assessment.

Examples:

- The assessment by Ernst Pernicka et al. about the provenance of the Nebra Sky Disc *concluded that* Ernst Pernicka et al. believe that the Nebra Sky Disc dates to the Early Bronze Age (Pernicka et al. 2020)

In First Order Logic:

$Jxx1(x,y) \Rightarrow Ix3(x)$   
 $Jxx1(x,y) \Rightarrow Ix5(y)$   
 $Jxx1(x,y) \Rightarrow J2(x,y)$

[Jxx10 interpreted meaning of \[D: Ix1 Meaning Comprehension, E73 Information Object\]](#)

**Jxx10 interpreted meaning of (was interpreted by)**

Domain: Ix1 Meaning Comprehension

Range: E73 Information Object

Subproperty of: P16 used specific object (was used for)

Superproperty of:

Quantification: many to many, necessary (1,n:0,n)

Scope note: This property associates an instance of Ix1 Meaning Comprehension with the instance of E73 Information Object that was a source of, or evidence for, the interpretation of its intended meaning. If sources are fragmentary about or complementary to a specific topic, more than one source may have been used.

Examples:

- My understanding of the statements about Emperor Nero's whereabouts in Rome while it was burning from July 19 in 64 AD *interpreted meaning of* the extant book *De Vita Caesarum* by Gaius Suetonius Tranquillus.

In First Order Logic:

$$Jxx10(x,y) \Rightarrow Ix1(x)$$

$$Jxx10(x,y) \Rightarrow E73(y)$$

[Jxx11 interpreted meaning as \[\[D: Ix1 Meaning Comprehension, R: Ix2 Intended Meaning Belief\]](#)

**Jxx11 interpreted meaning as (was interpretation by)**

Domain: Ix1 Meaning Comprehension

Range: Ix2 Intended Meaning Belief

Subproperty of: J2 concluded that (was concluded by)

Superproperty of:

Quantification: one to many, necessary, dependent (1,n:1,1)

Scope note: This property associates an instance of Ix1 Meaning Comprehension with the instance of Ix2 Intended Meaning Belief that was the result of the interpretation of the intended meaning of the analysed source or sources.

Examples:

- My understanding of the statements about Emperor Nero's whereabouts in Rome while it was burning from July 19 in 64 AD *interpreted meaning as* believing that it meant that Nero was singing in Rome while it was burning from July 19 in 64 AD.

In First Order Logic:

$$Jxx11(x,y) \Rightarrow Ix1(x)$$

$$Jxx11(x,y) \Rightarrow Ix2(y)$$

### Updating definitions:

#### I2 Belief

NEW

Subclass of: E2 Temporal Entity

Superclass of

Scope note: This class comprises the notion that the associated I4 Proposition Set is held to have a particular I6 Belief Value by a particular E39 Actor. This can be understood as the period of time that an individual or group holds a particular set of propositions to be true, false or somewhere in between.

Properties: J4 that (is subject of): I4 Proposition Set

J5 holds to be: I6 Belief Value

Examples:

- Ian Hodder's belief from 1996 on that Floor B was earlier than wall C of building 1 in the north area of Catalhöyük (Hodder 1999).

OLD

Subclass of: I8 Conviction

Superclass of

Scope note: This class comprises the notion that the associated I4 Proposition Set is held to have a particular I6 Belief Value by a particular E39 Actor. This can be understood as the period of time that an individual or group holds a particular set of propositions to be true, false or somewhere in between..

Properties: J4 that (is subject of): I4 Proposition Set

J5 holds to be: I6 Belief Value

Examples:

- My belief that Dragendorff type 29 bowls are from the 1st Century AD
- Dragendorff's belief that type 29 bowls are from the 1st Century AD

#### I7 Belief Adoption

NEW

Subclass of: [I1](#) Argumentation

Superclass of:

Scope note: This class comprises the action of an E39 Actor adopting propositions taken from an interpretation of the intended meaning of an instance of E73 Information Object as being true or in some way likely to be true. The adopted propositions constitute the conclusion of the action in the form of a new instance of Ix4 Adopted Belief of the adopting actor.

The basis of I7 Belief Adoption is the justification of trust in the source of the adopted propositions rather than the application of rules for inferring the respective propositions from logical premises.

Typical examples are the citation of academic papers or the reuse of data sets.



Where an instance of I7 Belief Adoption is based on personal communication (marked as pers.comm. in the studied text) this should be represented by using P2 *has type*: “Pers.Comm.” directly from the instance of I7 Belief Adoption.

Properties:

Jxx5 adopted interpretation (was concluded by): Ix4 Adopted Belief  
J7 is based on evidence from (was evidence for): E73 Information Object  
Jxx3 assumed meaning (was assumed by): Ix2 Intended Meaning Belief  
Jxx4 assumed provenance (was assumed by): Ix5 Provenance Belief

Examples:

- Francesca Bologna’s adoption of Tacitus’ belief where Emperor Nero was when the Great Fire started. (F. Bologna, 2021). [Francesca Bologna adopted Tacitus belief, as the only historian who was actually alive at the time of the Great Fire of Rome (although only 8 years old): "Nero at this time was at Antium and did not return to Rome until the fire approached his house" in : Tacitus, Publius Cornelius. The Annals. Book 15 [15.16].]

In First Order Logic:

$I7(x) \Rightarrow I1(x)$

OLD

Subclass of: I1 Argumentation

Superclass of:

Scope note: This class comprises the action of an E39 Actor adopting a particular instance of I2 Belief to create a new instance of I2 Belief that shares some of the same propositions in the original I4 Proposition Set and the associated I6 Belief Value.

The basis of I7 Belief Adoption is trust in the source of the instance of I2 Belief rather than the application of the rules in instances of I3 Inference Logic.

Typical examples are the citation of academic papers or the reuse of data sets.

Where an instance of I7 Belief Adoption is based on personal communication (marked as pers.comm. in the studied text) this should be represented by using P2 *has type*: “Pers.Comm.” directly from the instance of I7 Belief Adoption.

Properties:

J6 adopted (adopted by): I2 Belief  
J7 is based on evidence (is evidence for): E73 Information Object  
J11 used manifestation (was manifestation used by): F3 Manifestation  
**J12** used (was used by): F5 Item

Examples:

- My adoption of the belief that Dragendorff type 29 bowls are from the 1st Century AD

## I10 Provenance Statement

NEW

Subclass of: I4 Proposition Set

Superclass of:

Scope note: This class comprises statements about the provenance of instances of E70 Thing existing at the time of making the provenance statements. An instance of I10 Provenance Statement must contain propositions about the presence of the respective instances of E70 Thing in an event or spatiotemporal context of reference. Characteristically, it may pertain to the writing by a known author at a known or unknown date or place, or to the existence of the text known to some public regardless of the truth of authorship.

In case that only information objects exist describing the proper thing of interest, such as a photo, or photo of a photo of a lost archaeological object, an instance of I10 Provenance Statement should contain or refer to the relevant chain of intermediate events transferring the information from the proper thing of interest up to the extant information objects taken into account.

The property *Jxx9 is about provenance of* can be used to link the instance of I10 Provenance Statement as a whole with the proper thing of interest. It constitutes a constraint to the provenance statement that it must contain the description of the relevant context of reference and, if applicable, to the relevant chain of intermediate events transferring the information.

Properties: Jxx9 is about the provenance of (has provenance claim): E70 Thing

Examples:

- The statement: “The copy of Tacitus, Publius Cornelius. The Annals. Book 15 [15.16] at hands of Francesca Bologna from the British Museum in 2021 represents a text written by the ancient Roman historian Publius Cornelius Tacitus.” [This statement can be represented by a set of CRM compatible propositions]
- The statement: “The Latin content of the extant book De Vita Caesarum attributed to Gaius Suetonius Tranquillus was published in Rome 121AD and not alienated in its propositional content by essential transcription errors until its currently known form.” [This statement can be represented by a set of CRM compatible propositions]
- The statement: “The exemplar of The Merchant of Venice, Quarto 1 (1600) owned by The British Library, shelf number BL C.34.k.22 was published 1600AD by Thomas Heyes.” [This statement can be represented by a set of CRM compatible propositions]
- The statement: “the Nebra Sky Disc dates to the Early Bronze Age” (Pernicka et al. 2020)

In First Order Logic:

$$I10(x) \Rightarrow I4(x)$$

OLD

Subclass of: I4 Proposition Set

Superclass of:

Scope note: This class comprises statements about the provenance of an instance of E73 Information Object with known content at the time of making the provenance statements. An instance of I10 Provenance Statement must contain propositions about the presence of a carrier of the respective instance of E73 Information Object in an event or spatiotemporal context of reference.

Characteristically, it may pertain to the writing by a known author at a known or unknown date or place, or to the existence of the text known to some public regardless the truth of authorship.

Examples:

- The Latin content of the extant book *De Vita Caesarum* attributed to Gaius Suetonius Tranquillus was published in Rome 121AD and not alienated in its propositional content by essential transcription errors until its currently known form.
- The exemplar of *The Merchant of Venice*, Quarto 1 (1600) owned by The British Library, shelf number BL C.34.k.22 was published 1600AD by Thomas Heyes.

In First Order Logic:

$$I10(x) \supset I4(x)$$

J2 concluded that [D: I1 Argumentation, R: I2 Belief]

NEW

Domain: I1 Argumentation

Range: I2 Belief

Subproperty of:

Superproperty of:

Quantification: one to many, necessary, dependent (1,n:1,n)

Scope note: This property associates an instance of I2 Belief with the instance of I1 Argumentation that concluded it.

Examples:

- Ian Hodder's reexamination in 1996 of the physical relation of Wall C and floor B of building 1 in the north area of Catalhöyük *concluded that* Ian Hodder's belief from 1996 on that Floor B was earlier than wall C of building 1 in the north area of Catalhöyük (Hodder 1999)

In First Order Logic:

$$J2(x,y) \supset I1(y)$$

$$J2(x,y) \supset I2(y)$$

$$J2(x,y) \supset P116(x,y)$$

OLD

Domain: I1 Argumentation

Range: I8 Conviction

Subproperty of: P116 starts (is started by)

Superproperty of:

Quantification: one to many, necessary, dependent (1,n:1,n)

Scope note: This property associates an instance of I8 Conviction with the instance of I1 Argumentation that concluded it.

Examples:

- My classification and dating of this bowl (I5) concluded that my belief that this bowl is from the 1st Century AD (I2)

In First Order Logic:

$$J2(x,y) \supset I1(y)$$

$$J2(x,y) \supset I8(y)$$

$$J2(x,y) \supset P116(x,y)$$

J7 is based on evidence from [D: I7 Belief Adoption, R: E73 Information Object]

NEW

Domain: I7 Belief Adoption

Range: E73 Information Object

Subproperty of: P16 used specific object (was used for)

Superproperty of:

Quantification: many to many, necessary (1,n:0,n)

Scope note: This property associates an instance of I7 Belief Adoption with the instance of E73 Information Object that was a source of, or evidence for, the I4 Proposition Set that was adopted.

Examples:

- Francesca Bologna's adoption of Tacitus' belief where Emperor Nero was when the Great Fire started *J7 is based on evidence from* Tacitus, Publius Cornelius. The Annals. Book 15 [15.16] (F. Bologna, 2021)

In First Order Logic:

$$J7(x,y) \Rightarrow I7(x)$$

$$J7(x,y) \Rightarrow E73(y)$$

$$J7(x,y) \Rightarrow P16(x,y)$$

OLD

Domain: I7 Belief Adoption

Range: E73 Information Object

Subproperty of: P16 used specific object (was used for)

Superproperty of:

Quantification: many to many (0,n:0,n)

Scope note: This property associates an instance of I7 Belief Adoption with the instance of E73 Information Object that was the source of or evidence for the I4 Proposition Set that was adopted.

Examples:

- My adoption of the belief that Dragendorff type 29 bowls are from the 1st Century AD (I7) *is based on evidence from* Hans Dragendorff, "Terra sigillata. Ein Beitrag zur Geschichte der griechischen und römischen Keramik", *Bonner Jahrbücher* 96 (1895), 18-155 (E73)

New example to be used in I4 Proposition Set, J2 that

This example is to be related to an example of I4 Proposition Set:

Francesca Bologna's belief that Publius Cornelius Tacitus meant that "Nero was at Antium when the Great Fire broke out and did not return to Rome until the fire approached his house" (Ix4) *J2 that*

{Nero in July 19, 64 AD (E93 Presence)

P164 is temporally specified by: July 19, 64 AD (E52 Timespan)

P195 was a presence of: Nero Claudius Caesar Drusus Germanicus (E21 Person)

P167 was within Antium in 64AD, Italy (E53 Place)

P133 is spatiotemporally separated from: The Great Fire of Rome (E5 Event)

P1 is identified by: incendium magnum Romae (E41 Appellation)

P4 has timespan: July 19-27, 64 AD (E52 Timespan)

P7 took place at : Rome in 64AD, Italy (E53 Place)

} (F. Bologna, 2021)

} (I4) (F. Bologna, 2021)]

New example to be used in I4 Proposition Set

Francesca Bologna's belief that Gaius Suetonius Tranquillus meant that Nero was singing in Rome while it was burning from July 19 in 64 AD *Jxx6 assumed meaning*

{Nero July 19, 64 AD (E93 Presence)

P164 is temporally specified by: July 19, 64 AD (E52 Timespan)

P195 was a presence of: Nero Claudius Caesar Drusus Germanicus (E21 Person)

P167 was within Rome in 64AD, Italy (E53 Place)

P10 falls within (contains): Nero Singing (E7 Activity)

P2 has type: Singing (E55 Type)

P14 carried out by: Nero Claudius Caesar Drusus Germanicus (E21)

P4 has timespan: July 19, 64 AD (E52 Timespan)

P7 took place at: Rome in 64AD, Italy (E53 Place)

P132 spatiotemporally overlaps with: The Great Fire of Rome (E5 Event)

P1 is identified by: incendium magnum Romae (E41 Appellation)

P4 has timespan: July 19-27, 64 AD (E52 Timespan)

P7 took place at: Rome in 64AD, Italy (E53 Place)

} (I4) (F. Bologna, 2021)

Issue 431

*NEW definition*

**Class:** A class is a category of items that share one or more common traits serving as criteria to identify the items belonging to the class. These **properties** need not be explicitly formulated in logical terms, but may be described in a text (here called a **scope note**) that refers to a common conceptualisation of domain experts. The sum of these traits is called the intension of the class and constitutes its definition. In the CRM, a class is identified by an alphanumeric code and a name, for mnemonic reasons, which should not be regarded as definition. A class may be the **domain** or **range** of none, one or more properties formally defined in a model. The formally defined properties need not be part of the intension of their domains or ranges: such properties are optional. An item that belongs to a class is called an **instance** of this class. In any interpretation, or possible world, a class is associated with a set of real-life individuals, known as the extension of the class in that interpretation. The sum of the extensions over all interpretations equals to the intension of the class. Here "open" is used in the sense that it is generally beyond our capabilities to know all instances of a class in the world and indeed that the future may bring new instances about at

any time (**Open World**). Therefore, a class cannot be defined by enumerating its instances. A class plays a role analogous to a grammatical noun, and can be completely defined without reference to any other construct (unlike properties, which must have an unambiguously defined domain and range). In some contexts, the terms individual class, entity or node are used synonymously with class.

#### *OLD definition*

**Class:** A class is a category of items that share one or more common traits serving as criteria to identify the items belonging to the class. These **properties** need not be explicitly formulated in logical terms, but may be described in a text (here called a **scope note**) that refers to a common conceptualisation of domain experts. The sum of these traits is called the intension of the class *and constitutes its definition*. *In the CRM, a class is identified by an alphanumeric code and a name, for mnemonic reasons, which should not be regarded as definition*. A class may be the **domain** or **range** of none, one or more properties formally defined in a model. The formally defined properties need not be part of the intension of their domains or ranges: such properties are optional. An item that belongs to a class is called an **instance** of this class. A class is associated with an open set of real life instances, known as the **extension** of the class. Here “open” is used in the sense that it is generally beyond our capabilities to know all instances of a class in the world and indeed that the future may bring new instances about at any time (**Open World**). Therefore, a class cannot be defined by enumerating its instances. A class plays a role analogous to a grammatical noun, and can be completely defined without reference to any other construct (unlike properties, which must have an unambiguously defined domain and range). In some contexts, the terms individual class, entity or node are used synonymously with class.

Issue 635:

*P10 falls within (contains) [D: E92 Spacetime Volume, R: E92 Spacetime Volume]*

NEW property quantification

(1,n:1,n) “many to many, necessary, dependent”

OLD property quantification

(1,n:0,n) “many to many necessary, dependent”

*P81 ongoing throughout [D: E52 Time-span, R: E61 Time Primitive]*

NEW property quantification

(1,n:0,n) “many to many, necessary”

OLD property quantification

(1,n:0,n) “many to one necessary”

*P89 falls within (contains) [D: E53 Place, R: E53 Place]*

NEW property quantification

(1,n:1,n) “many to many, necessary, dependent”

OLD property quantification

(1,n:0,n) “many to many necessary, dependent”

*P99 dissolved (was dissolved by) [D: E68 Dissolution, R: E74 Group]*

NEW property quantification

(1,n:0,1) “one to many necessary”

OLD property quantification

(1,n:0,n) “one to many necessary”

*P161 has spatial projection (is spatial projection of) [D: E92 Spacetime Volume, R: E53 Place]*

NEW property quantification

(1,n:0,n) "one to many, necessary"

OLD property quantification

(1,n:0,n) "many to many, necessary, dependent"

*P187 has production plan (is production plan for) [D: E99 Product Type, R: E29 Design or Procedure]*

NEW property quantification

(1,n:0,1) "one to many, necessary"

OLD property quantification

(1,n:1,1) "one to many"

*P188 requires production tool (is production tool for) [D: E99 Product Type, R: E19 Physical Object]*

NEW property quantification

(0,n:0,n) "many to many"

OLD property quantification

(1,n:1,1) "one to many"

*P198 holds or supports (is held or supported by) [D: E18 Physical Thing, R: E19 Physical Thing]*

NEW property quantification

(0,n:0,n) "one to many"

OLD property quantification

(0,n:0,n) "many to many"

Issue 615:

*NEW definition*

### **E13 Attribute Assignment**

Subclass of:

E7 Activity

Superclass of:

E14 Condition Assessment

E15 Identifier Assignment

E16 Measurement

E17 Type Assignment

Scope note:

This class comprises the actions of making assertions about one property of an object or any single relation between two items or concepts. The type of the property asserted to hold between two items or concepts can be described by the property *P177 assigned property of type (is type of property assigned)*: E55 Type.

For example, the class describes the actions of people making propositions and statements during certain scientific/scholarly procedures, e.g., the person and date when a condition statement was made, an identifier was assigned, the museum object was measured, etc. Which kinds of such

assignments and statements need to be documented explicitly in structures of a schema rather than free text, depends on whether this information should be accessible by structured queries.

This class allows for the documentation of how the respective assignment came about, and whose opinion it was. Note that all instances of properties described in a knowledge base are the opinion of someone. Per default, they are the opinion of the team maintaining the knowledge base. This fact must not individually be registered for all instances of properties provided by the maintaining team, because it would result in an endless recursion of whose opinion was the description of an opinion. Therefore, the use of instances of E13 Attribute Assignment marks the fact that the maintaining team is in general neutral to the validity of the respective assertion, but registers someone else's opinion and how it came about.

All properties assigned in such an action can also be seen as directly relating the respective pair of items or concepts. Multiple use of instances of E13 Attribute Assignment may possibly lead to a collection of contradictory values.

Examples:

- the examination of MS Sinai Greek 418 by Nicholas Pickwoad in November 2003 (Honey & Pickwoad, 2010)
- the assessment of the current ownership of Martin Doerr's silver cup in February 1997 (fictitious)

In first-order logic:

$E13(x) \Rightarrow E7(x)$

Properties:

P140 assigned attribute to (was attributed by): E1 CRM Entity

P141 assigned (was assigned by): E1 CRM Entity

P177 assigned property of type (is type of property assigned): E55 Type

*OLD definition*

## **E13 Attribute Assignment**

Subclass of:

E7 Activity

Superclass of:

E14 Condition Assessment

E15 Identifier Assignment

E16 Measurement

E17 Type Assignment

Scope note:

This class comprises the actions of making assertions about one property of an object or any single relation between two items or concepts. The type of the property asserted to hold between two items or concepts can be described by the property *P177 assigned property of type (is type of property assigned): E55 Type*.

For example, the class describes the actions of people making propositions and statements during certain scientific/scholarly procedures, e.g., the person and date when a condition statement was made, an identifier was assigned, the museum object was measured, etc. Which kinds of such assignments and statements need to be documented explicitly in structures of a schema rather than free text, depends on whether this information should be accessible by structured queries.



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All properties assigned in such an action can also be seen as directly relating the respective pair of items or concepts. Multiple use of instances of E13 Attribute Assignment may possibly lead to a collection of contradictory values.

All cases of properties in this model that are also described indirectly through a subclass of E13 Attribute Assignment are characterised as "short cuts" of a path via this subclass. This redundant modelling of two alternative views is preferred because many implementations may have good reasons to model either the action of assertion or the short cut, and the relation between both alternatives can be captured by simple rules.

Examples:

- the examination of MS Sinai Greek 418 by Nicholas Pickwoad in November 2003 (Honey & Pickwoad, 2010)
- the assessment of the current ownership of Martin Doerr's silver cup in February 1997 (fictitious)

In first-order logic:

$E13(x) \Rightarrow E7(x)$

Properties:

P140 assigned attribute to (was attributed by): E1 CRM Entity

P141 assigned (was assigned by): E1 CRM Entity

P177 assigned property of type (is type of property assigned): E55 Type

Issue 588:

*Point E:*

```
<!--  
*** Main classes and properties needed for implementing a substitute of n-ary  
relations defined in the CIDOC CRM ***  
-->
```

```
<!--  
*** Property classes needed for implementing a substitute of n-ary relations  
defined in the CIDOC CRM ***  
-->
```

```

<!--
*** Properties of properties (.1 properties) ***
The domain of a .1 property is a property class representing the n-ary
relationship form of the corresponding property having the .1 property.
-->

```

Point F:

```

<!--
*** Main classes and properties needed for implementing a substitute of n-ary
relations defined in the CIDOC CRM ***
-->

```

```

<rdfs:Class rdf:about="PC0_Typed_CRM_Property">
  <rdfs:label xml:lang="en">Typed CRM Property</rdfs:label>
  <rdfs:comment>This class comprises all classes representing properties
that have properties, thereby allowing representing n-ary relationships in
RDF. </rdfs:comment>
</rdfs:Class>

```

```

<rdf:Property rdf:about="P01_has_domain">
  <rdfs:label xml:lang="en">has domain</rdfs:label>
  <rdfs:comment xml:lang="en">This property associates an instance of a
property class with an instance of the property's domain class. For example,
it links an instance of 'PC14 carried out by' (the property class of 'P14
carried out by') with an instance of 'E7 Activity' (the domain of 'P14 carried
out by').</rdfs:comment>
  <rdfs:domain rdf:resource="PC0_Typed_CRM_Property" />
  <rdfs:range rdf:resource="E1_CRM_Entity" />
  <owl:inverseOf rdf:resource="P01i_is_domain_of" />
</rdf:Property>

```

```

<rdf:Property rdf:about="P01i_is_domain_of">
  <rdfs:label xml:lang="en">is domain of</rdfs:label>
  <rdfs:comment xml:lang="en">This property associates an instance of a
property's domain class with an instance of the property's property class. For
example, it links an instance of 'E7 Activity' (the domain of 'P14 carried out
by') with an instance of 'PC14 carried out by' (the property class of 'P14
carried out by').</rdfs:comment>

```

```
<rdfs:domain rdf:resource="E1_CRM_Entity" />
<rdfs:range rdf:resource="PC0_Typed_CRM_Property" />
  <owl:inverseOf rdf:resource="P01_has_domain" />
</rdf:Property>
```

```
<rdf:Property rdf:about="P02_has_range">
  <rdfs:label xml:lang="en">has range</rdfs:label>
  <rdfs:comment xml:lang="en">This property associates an instance of a
property class with an instance of the property's range class. For example, it
links an instance of 'PC14 carried out by' (the property class of 'P14 carried
out by') with an instance of 'E39 Actor' (the range of 'P14 carried out
by').</rdfs:comment>
  <rdfs:domain rdf:resource="PC0_Typed_CRM_Property" />
  <rdfs:range rdf:resource="E1_CRM_Entity" />
  <owl:inverseOf rdf:resource="P02i_is_range_of" />
</rdf:Property>
```

```
<rdf:Property rdf:about="P02i_is_range_of">
  <rdfs:label xml:lang="en">is range of</rdfs:label>
  <rdfs:comment xml:lang="en">This property associates an instance of a
property's range class with an instance of the property's property class. For
example, it links an instance of 'E39 Actor' (the range of 'P14 carried out
by') with an instance of 'PC14 carried out by' (the property class of 'P14
carried out by').</rdfs:comment>
  <rdfs:domain rdf:resource="E1_CRM_Entity" />
  <rdfs:range rdf:resource="PC0_Typed_CRM_Property" />
  <owl:inverseOf rdf:resource="P02_has_range" />
</rdf:Property>
```

```
<rdf:Property rdf:about="P03_has_range_literal">
  <rdfs:label xml:lang="en">has range literal</rdfs:label>
  <rdfs:comment xml:lang="en">This property associates an instance of a
property class with a literal value that is an instance of the property's
range class. For example, it links an instance of 'PC3 has note' (the property
class of 'P3 has note') with a text (literal) representing a note (the range
of 'P3 has note').</rdfs:comment>
```

```
<rdfs:domain rdf:resource="PC0_Typed_CRM_Property" />
<rdfs:range rdf:resource="http://www.w3.org/2000/01/rdf-schema#Literal" />
</rdf:Property>
```

<!--

**\*\*\* Property classes needed for implementing a substitute of n-ary relations defined in the CIDOC CRM \*\*\***

-->

```
<rdfs:Class rdf:about="PC3_has_note">
  <rdfs:label xml:lang="en">has note</rdfs:label>
  <rdfs:comment xml:lang="en">This class is the representation of the n-ary relationship form of the property 'P3 has note'.
  This property is a container for all informal descriptions about an object that have not been expressed in terms of CIDOC CRM constructs. In particular, it captures the characterisation of the item itself, its internal structures, appearance etc. Like property P2 has type (is type of), this property is a consequence of the restricted focus of the CIDOC CRM. The aim is not to capture, in a structured form, everything that can be said about an item; indeed, the CIDOC CRM formalism is not regarded as sufficient to express everything that can be said. Good practice requires use of distinct note fields for different aspects of a characterisation. The P3.1 has type property of P3 has note allows differentiation of specific notes, e.g., "construction", "decoration" etc. An item may have many notes, but a note is attached to a specific item.</rdfs:comment>
  <rdfs:subClassOf rdf:resource="PC0_Typed_CRM_Property" />
  <crm:P04_represents rdf:resource="P3_has_note" />
</rdfs:Class>
```

```
<rdfs:Class rdf:about="PC14_carried_out_by">
  <rdfs:label xml:lang="en">carried out by</rdfs:label>
  <rdfs:comment xml:lang="en">This class is the representation of the n-ary relationship form of the property 'P14 carried out by'.
  This property describes the active participation of an instance of E39 Actor in an instance of E7 Activity. It implies causal or legal responsibility. The P14.1 in the role of property of the property specifies the nature of an Actor's participation.</rdfs:comment>
  <rdfs:subClassOf rdf:resource="PC0_Typed_CRM_Property" />
```

```
<crm:P04_represents rdf:resource="P14_carried_out_by" />
</rdfs:Class>
```

```
<rdfs:Class rdf:about="PC16_used_specific_object">
  <rdfs:label xml:lang="en">used specific object</rdfs:label>
  <rdfs:comment xml:lang="en">This class is the representation of the n-
ary relationship form of the property 'P16 used specific object'.

  This property describes the use of material or immaterial things in a
way essential to the performance or the outcome of an instance of E7 Activity.
This property typically applies to tools, instruments, moulds, raw materials
and items embedded in a product. It implies that the presence of the object in
question was a necessary condition for the action. For example, the activity
of writing this text required the use of a computer. An immaterial thing can
be used if at least one of its carriers is present. For example, the software
tools on a computer. Another example is the use of a particular name by a
particular group of people over some span to identify a thing, such as a
settlement. In this case, the physical carriers of this name are at least the
people understanding its use.</rdfs:comment>

  <rdfs:subClassOf rdf:resource="PC0_Typed_CRM_Property" />
  <crm:P04_represents rdf:resource="P16_used_specific_object" />
</rdfs:Class>
```

```
<rdfs:Class rdf:about="PC19_was_intended_use_of">
  <rdfs:label xml:lang="en">was intended use of</rdfs:label>
  <rdfs:comment xml:lang="en">This class is the representation of the n-
ary relationship form of the property 'P19 was intended use of'.

  This property relates an instance of E7 Activity with instances of E71
Human-Made Thing, created specifically for use in the activity. This is
distinct from the intended use of an item in some general type of activity
such as the book of common prayer which was intended for use in Church of
England services (see P101 had as general use (was use of)).</rdfs:comment>

  <rdfs:subClassOf rdf:resource="PC0_Typed_CRM_Property" />
  <crm:P04_represents rdf:resource="P19_was_intended_use_of" />
</rdfs:Class>
```

```
<rdfs:Class rdf:about="PC62_depicts">
  <rdfs:label xml:lang="en">depicts</rdfs:label>
```

```
<rdfs:comment xml:lang="en">This class is the representation of the n-ary relationship form of the property 'P62 depicts'.
```

This property identifies something that is depicted by an instance of E24 Physical Human-Made Thing. Depicting is meant in the sense that an instance of E24 Physical Human-Made Thing intentionally shows, through its optical qualities or form, a representation of the entity depicted. Photographs are by default regarded as being intentional in this sense. Anything that is designed to change the properties of the depiction, such as an e-book reader, is specifically excluded. The property does not pertain to inscriptions or any other information encoding. This property is a shortcut of the more fully developed path from E24 Physical Human-Made Thing through P65 shows visual item, E36 Visual Item, P138 represents to E1 CRM Entity. P138.1 mode of depiction allows the nature of the depiction to be refined.</rdfs:comment>

```
<rdfs:subClassOf rdf:resource="PC0_Typed_CRM_Property" />  
<crm:P04_represents rdf:resource="P62_depicts" />  
</rdfs:Class>
```

```
<rdfs:Class rdf:about="PC67_refers_to">
```

```
<rdfs:label xml:lang="en">refers to</rdfs:label>
```

```
<rdfs:comment xml:lang="en">This class is the representation of the n-ary relationship form of the property 'P67 refers to'.
```

This property documents that an instance of E89 Propositional Object makes a statement about an instance of E1 CRM Entity. P67 refers to (is referred to by) has the P67.1 has type link to an instance of E55 Type. This is intended to allow a more detailed description of the type of reference. This differs from P129 is about (is subject of), which describes the primary subject or subjects of the instance of E89 Propositional Object.</rdfs:comment>

```
<rdfs:subClassOf rdf:resource="PC0_Typed_CRM_Property" />  
<crm:P04_represents rdf:resource="P67_refers_to" />  
</rdfs:Class>
```

```
<rdfs:Class rdf:about="PC69_has_association_with">
```

```
<rdfs:label xml:lang="en">has association with</rdfs:label>
```

```
<rdfs:comment xml:lang="en">This class is the representation of the n-ary relationship form of the property 'P69 has association with'.
```

This property generalises relationships like whole-part, sequence, prerequisite or inspired by between instances of E29 Design or Procedure. Any

instance of E29 Design or Procedure may be associated with other designs or procedures. The property is considered to be symmetrical unless otherwise indicated by P69.1 has type. The property is not transitive. The P69.1 has type property of P69 has association with allows the nature of the association to be specified reading from domain to range; examples of types of association between instances of E29 Design or Procedure include: has part, follows, requires, etc. The property can typically be used to model the decomposition of the description of a complete workflow into a series of separate procedures.</rdfs:comment>

```
<rdfs:subClassOf rdf:resource="PC0_Typed_CRM_Property" />
  <crm:P04_represents rdf:resource="P69_has_association_with" />
</rdfs:Class>
```

```
<rdfs:Class rdf:about="PC102_has_title">
  <rdfs:label xml:lang="en">has title</rdfs:label>
  <rdfs:comment xml:lang="en">This class is the representation of the n-ary relationship form of the property 'P102 has title'.
```

This property associates an instance of E35 Title has been applied to an instance of E71 Human-Made Thing. The P102.1 has type property of the P102 has title (is title of) property enables the relationship between the title and the thing to be further clarified, for example, if the title was a given title, a supplied title etc. It allows any human-made material or immaterial thing to be given a title. It is possible to imagine a title being created without a specific object in mind.</rdfs:comment>

```
<rdfs:subClassOf rdf:resource="PC0_Typed_CRM_Property" />
  <crm:P04_represents rdf:resource="P102_has_title" />
</rdfs:Class>
```

```
<rdfs:Class rdf:about="PC107_has_current_or_former_member">
  <rdfs:label xml:lang="en">has current or former member</rdfs:label>
  <rdfs:comment xml:lang="en">This class is the representation of the n-ary relationship form of the property 'P107 has current or former member'.
```

This property associates an instance of E74 Group with an instance of E39 Actor that is or has been a member thereof. Instances of E74 Group and E21 Person, may all be members of instances of E74 Group. An instance of E74 Group may be founded initially without any member. This property is a shortcut of the more fully developed path from E74 Group, P144i gained member by, E85 Joining, P143 joined to E39 Actor. The property P107.1 kind of member can be used to specify the type of membership or the role the member has in the group.</rdfs:comment>

```

<rdfs:subClassOf rdf:resource="PC0_Typed_CRM_Property" />
  <crm:P04_represents rdf:resource="P107_has_current_or_former_member" />
</rdfs:Class>

```

```

<rdfs:Class rdf:about="PC130_shows_features_of">
  <rdfs:label xml:lang="en">shows features of</rdfs:label>
  <rdfs:comment xml:lang="en">This class is the representation of the n-
ary relationship form of the property 'P130 shows features of'.
  This property generalises the notions of "copy of" and "similar to" into
  a directed relationship, where the domain expresses the derivative or
  influenced item and the range the source or influencing item, if such a
  direction can be established. The property can also be used to express
  similarity in cases that can be stated between two objects only, without
  historical knowledge about its reasons. The property expresses a symmetric
  relationship in case no direction of influence can be established either from
  evidence on the item itself or from historical knowledge. This holds in
  particular for siblings of a derivation process from a common source or non-
  causal cultural parallels, such as some weaving patterns. The P130.1 kind of
  similarity property of the P130 shows features of (features are also found on)
  property enables the relationship between the domain and the range to be
  further clarified, in the sense from domain to range, if applicable. For
  example, it may be expressed if both items are product "of the same mould", or
  if two texts "contain identical paragraphs". If the reason for similarity is a
  sort of derivation process, i.e., that the creator has used or had in mind the
  form of a particular thing during the creation or production, this process
  should be explicitly modelled. In these cases, P130 shows features of can be
  regarded as a shortcut of such a process. However, the current model does not
  contain any path specific enough to infer this property. Specializations of
  the CIDOC CRM may however be more explicit, for instance describing the use of
  moulds etc. This property is not transitive.</rdfs:comment>
  <rdfs:subClassOf rdf:resource="PC0_Typed_CRM_Property" />
  <crm:P04_represents rdf:resource="P130_shows_features_of" />
</rdfs:Class>

```

```

<rdfs:Class rdf:about="PC136_was_based_on">
  <rdfs:label xml:lang="en">was based on</rdfs:label>
  <rdfs:comment xml:lang="en">This class is the representation of the n-
ary relationship form of the property 'P136 was based on'.
  This property identifies one or more instances of E1 CRM Entity that
  were used as evidence to declare a new instance of E55 Type. The examination
  of these items is often the only objective way to understand the precise

```



characteristics of a new type. Such items should be deposited in a museum or similar institution for that reason. The taxonomic role renders the specific relationship of each item to the type, such as "holotype" or "original element".</rdfs:comment>

```
<rdfs:subClassOf rdf:resource="PC0_Typed_CRM_Property" />
  <crm:P04_represents rdf:resource="P136_was_based_on" />
</rdfs:Class>
```

```
<rdfs:Class rdf:about="PC137_exemplifies">
  <rdfs:label xml:lang="en">exemplifies</rdfs:label>
  <rdfs:comment xml:lang="en">This class is the representation of the n-ary relationship form of the property 'P137 exemplifies'.
```

This property associates an instance of E1 CRM Entity with an instance of E55 Type for which it has been declared to be a particularly characteristic example. The P137.1 in the taxonomic role property of P137 exemplifies (is exemplified by) allows differentiation of taxonomic roles. The taxonomic role renders the specific relationship of this example to the type, such as "prototypical", "archetypical", "lectotype", etc. The taxonomic role "lectotype" is not associated with the instance of E83 Type Creation itself but is selected in a later phase.</rdfs:comment>

```
<rdfs:subClassOf rdf:resource="PC0_Typed_CRM_Property" />
  <crm:P04_represents rdf:resource="P137_exemplifies" />
</rdfs:Class>
```

```
<rdfs:Class rdf:about="PC138_represents">
  <rdfs:label xml:lang="en">represents</rdfs:label>
  <rdfs:comment xml:lang="en">This class is the representation of the n-ary relationship form of the property 'P138 represents'.
```

This property establishes the relationship between an instance of E36 Visual Item and the instance of E1 CRM Entity that it visually represents. Any entity may be represented visually. This property is part of the fully developed path from E24 Physical Human-Made Thing through P65 shows visual item (is shown by), E36 Visual Item, P138 represents (has representation) to E1 CRM Entity, which is shortcut by P62 depicts (is depicted by). P138.1 mode of representation allows the nature of the representation to be refined. This property is also used for the relationship between an original and a digitisation of the original by the use of techniques such as digital photography, flatbed or infrared scanning. Digitisation is here seen as a process with a mechanical, causal component rendering the spatial distribution of structural and optical properties of the original and does not necessarily

```
include any visual similarity identifiable by human
observation.</rdfs:comment>
```

```
<rdfs:subClassOf rdf:resource="PC0_Typed_CRM_Property" />
  <crm:P04_represents rdf:resource="P138_represents" />
</rdfs:Class>
```

```
<rdfs:Class rdf:about="PC139_has_alternative_form">
  <rdfs:label xml:lang="en">has alternative form</rdfs:label>
  <rdfs:comment xml:lang="en">This class is the representation of the n-
ary relationship form of the property 'P139 has alternative form'.

  This property associates an instance of E41 Appellation with another
instance of E41 Appellation that constitutes a derivative or variant of the
former and that may also be used for identifying items identified by the
former, in suitable contexts, independent from the particular item to be
identified. This property should not be confused with additional variants of
names used characteristically for a single, particular item, such as
individual nicknames. It is an asymmetric relationship, where the range
expresses the derivative, if such a direction can be established. Otherwise,
the relationship is symmetric. The relationship is not transitive. Multiple
names assigned to an object, which do not apply to all things identified with
the specific instance of E41 Appellation, should be modelled as repeated
values of P1 is identified by (identifies) of this object. P139.1 has type
allows the type of derivation to be refined, for instance "transliteration
from Latin 1 to ASCII".</rdfs:comment>

  <rdfs:subClassOf rdf:resource="PC0_Typed_CRM_Property" />
  <crm:P04_represents rdf:resource="P139_has_alternative_form" />
</rdfs:Class>
```

```
<rdfs:Class rdf:about="PC144_joined_with">
  <rdfs:label xml:lang="en">joined with</rdfs:label>
  <rdfs:comment xml:lang="en">This class is the representation of the n-
ary relationship form of the property 'P144 joined with'.

  This property identifies the instance of E74 Group of which an instance
of E39 Actor becomes a member through an instance of E85 Joining. Although a
joining activity normally concerns only one instance of E74 Group, it is
possible to imagine circumstances under which becoming member of one Group
implies becoming member of another Group as well. Joining events allow for
describing people becoming members of a group with a more detailed path from
E74 Group through, P144i gained member by, E85 Joining, P143 joined, E39
Actor, compared to the shortcut offered by P107 has current or former member
```

(is current or former member of). The property P144.1 kind of member can be used to specify the type of membership or the role the member has in the group.</rdfs:comment>

```
<rdfs:subClassOf rdf:resource="PC0_Typed_CRM_Property" />
  <crm:P04_represents rdf:resource="P144_joined_with" />
</rdfs:Class>
```

```
<rdfs:Class rdf:about="PC189_approximates">
  <rdfs:label xml:lang="en">approximates</rdfs:label>
  <rdfs:comment xml:lang="en">This class is the representation of the n-ary relationship form of the property 'P189 approximates'.
```

This property associates an instance of E53 Place with another instance of E53 Place, which is defined in the same reference space, and which is used to approximate the former. The property does not necessarily state the quality or accuracy of this approximation, but rather indicates the use of the first instance of place to approximate the second. In common documentation practice, find or encounter spots e.g., in archaeology, botany or zoology are often related to the closest village, river or other named place without detailing the relation, e.g., if it is located within the village or in a certain distance of the specified place. In this case the stated "phenomenal" place found in the documentation can be seen as approximation of the actual encounter spot without more specific knowledge. In more recent documentation often point coordinate information is provided that originates from GPS measurements or georeferencing from a map. This point coordinate information does not state the actual place of the encounter spot but tries to approximate it with a "declarative" place. The accuracy depends on the methodology used when creating the coordinates. It may be dependent on technical limitations like GPS accuracy but also on the method where the GPS location is taken in relation to the measured feature. If the methodology is known a maximum deviation from the measured point can be calculated and the encounter spot or feature may be related to the resulting circle using an instance of P171 at some place within. This property is not transitive.</rdfs:comment>

```
<rdfs:subClassOf rdf:resource="PC0_Typed_CRM_Property" />
  <crm:P04_represents rdf:resource="P189_approximates" />
</rdfs:Class>
```

<!--

\*\*\* Properties of properties (.1 properties) \*\*\*

The domain of a .1 property is a property class representing the n-ary relationship form of the corresponding property having the .1 property.

-->

```
<rdf:Property rdf:about="P3.1_has_type">
  <rdfs:label xml:lang="en">has type</rdfs:label>
  <rdfs:comment xml:lang="en">This property allows differentiation of
specific notes, e.g., "construction", "decoration" etc.</rdfs:comment>
  <rdfs:domain rdf:resource="PC3_has_note" />
  <rdfs:range rdf:resource="E55_Type" />
</rdf:Property>
```

```
<rdf:Property rdf:about="P14.1_in_the_role_of">
  <rdfs:label xml:lang="en">in the role of</rdfs:label>
  <rdfs:comment xml:lang="en">This property specifies the nature of an
actor's participation in an activity.</rdfs:comment>
  <rdfs:domain rdf:resource="PC14_carried_out_by" />
  <rdfs:range rdf:resource="E55_Type" />
</rdf:Property>
```

```
<rdf:Property rdf:about="P16.1_mode_of_use">
  <rdfs:label xml:lang="en">mode of use</rdfs:label>
  <rdfs:comment xml:lang="en">This property specifies the mode of the
thing's use in an activity.</rdfs:comment>
  <rdfs:domain rdf:resource="PC16_used_specific_object" />
  <rdfs:range rdf:resource="E55_Type" />
</rdf:Property>
```

```
<rdf:Property rdf:about="P19.1_mode_of_use">
  <rdfs:label xml:lang="en">This property specifies the mode of the
thing's intended use in an activity.</rdfs:label>
```

```
<rdfs:comment xml:lang="en">TO DO.</rdfs:comment>
<rdfs:domain rdf:resource="PC19_was_intended_use_of" />
<rdfs:range rdf:resource="E55_Type" />
</rdf:Property>
```

```
<rdf:Property rdf:about="P62.1_mode_of_depiction">
  <rdfs:label xml:lang="en">mode of depiction</rdfs:label>
  <rdfs:comment xml:lang="en">This property specifies the nature of the
thing's depiction.</rdfs:comment>
  <rdfs:domain rdf:resource="PC62_depicts" />
  <rdfs:range rdf:resource="E55_Type" />
</rdf:Property>
```

```
<rdf:Property rdf:about="P67.1_has_type">
  <rdfs:label xml:lang="en">has type</rdfs:label>
  <rdfs:comment xml:lang="en">This property specifies the type of
reference.</rdfs:comment>
  <rdfs:domain rdf:resource="PC67_refers_to" />
  <rdfs:range rdf:resource="E55_Type" />
</rdf:Property>
```

```
<rdf:Property rdf:about="P69.1_has_type">
  <rdfs:label xml:lang="en">has type</rdfs:label>
  <rdfs:comment xml:lang="en">This property specifies the nature of the
association between two designs or procedures.</rdfs:comment>
  <rdfs:domain rdf:resource="PC69_has_association_with" />
  <rdfs:range rdf:resource="E55_Type" />
</rdf:Property>
```

```
<rdf:Property rdf:about="P102.1_has_type">
  <rdfs:label xml:lang="en">has type</rdfs:label>
  <rdfs:comment xml:lang="en">This property specifies the relationship
between the thing and the provided title.</rdfs:comment>
  <rdfs:domain rdf:resource="PC102_has_title" />
  <rdfs:range rdf:resource="E55_Type" />
</rdf:Property>
```

```
<rdf:Property rdf:about="P107.1_kind_of_member">
  <rdfs:label xml:lang="en">kind of member</rdfs:label>
  <rdfs:comment xml:lang="en">This property specifies the type of
membership or the role the member has in the group.</rdfs:comment>
  <rdfs:domain rdf:resource="PC107_has_current_or_former_member" />
  <rdfs:range rdf:resource="E55_Type" />
</rdf:Property>
```

```
<rdf:Property rdf:about="P130.1_kind_of_similarity">
  <rdfs:label xml:lang="en">kind of similarity</rdfs:label>
  <rdfs:comment xml:lang="en">This property allows further clarifying the
relationship of the two things. </rdfs:comment>
  <rdfs:domain rdf:resource="PC130_shows_features_of" />
  <rdfs:range rdf:resource="E55_Type" />
</rdf:Property>
```

```
<rdf:Property rdf:about="P136.1_in_the_taxonomic_role">
  <rdfs:label xml:lang="en">in the taxonomic role</rdfs:label>
  <rdfs:comment xml:lang="en">This property allows specifying the specific
relationship of each item to the type. </rdfs:comment>
  <rdfs:domain rdf:resource="PC136_was_based_on" />
```

```
<rdfs:range rdf:resource="E55_Type" />
</rdf:Property>
```

```
<rdf:Property rdf:about="P137.1_in_the_taxonomic_role">
  <rdfs:label xml:lang="en">in the taxonomic role</rdfs:label>
  <rdfs:comment xml:lang="en">This property allows specifying the specific
relationship of the example to the type.</rdfs:comment>
  <rdfs:domain rdf:resource="PC137_exemplifies" />
  <rdfs:range rdf:resource="E55_Type" />
</rdf:Property>
```

```
<rdf:Property rdf:about="P138.1_mode_of_representation">
  <rdfs:label xml:lang="en">mode of representation</rdfs:label>
  <rdfs:comment xml:lang="en">This property specifies the nature of the
entity's representation.</rdfs:comment>
  <rdfs:domain rdf:resource="PC138_represents" />
  <rdfs:range rdf:resource="E55_Type" />
</rdf:Property>
```

```
<rdf:Property rdf:about="P139.1_has_type">
  <rdfs:label xml:lang="en">has type</rdfs:label>
  <rdfs:comment xml:lang="en">This property specifies the type of
derivation.</rdfs:comment>
  <rdfs:domain rdf:resource="PC139_has_alternative_form" />
  <rdfs:range rdf:resource="E55_Type" />
</rdf:Property>
```

```
<rdf:Property rdf:about="P144.1_kind_of_member">
```

```
<rdfs:label xml:lang="en">kind of member</rdfs:label>

<rdfs:comment xml:lang="en">This property specifies the type of
membership or the role the member has in the group.</rdfs:comment>

<rdfs:domain rdf:resource="PC144_joined_with" />

<rdfs:range rdf:resource="E55_Type" />

</rdf:Property>
```

```
<rdf:Property rdf:about="P189.1_has_type">

  <rdfs:label xml:lang="en">has type</rdfs:label>

  <rdfs:comment xml:lang="en">This property specifies the type of
approximation. </rdfs:comment>

  <rdfs:domain rdf:resource="PC189_approximates" />

  <rdfs:range rdf:resource="E55_Type" />

</rdf:Property>

</rdf:RDF>
```

*Point G:*

Nb. To appear at the end of the section  
<!--  
\*\*\* Main classes and properties needed for implementing a substitute of n-ary  
relations defined in the CIDOC CRM \*\*\*  
-->  
of the PC file.

```
<rdf:Property rdf:about="P04_represents">

  <rdfs:label xml:lang="en">represents</rdfs:label>

  <rdfs:comment xml:lang="en">This property associates a property class
with the property it represents.</rdfs:comment>

  <rdfs:domain rdf:resource="http://www.w3.org/2000/01/rdf-schema#Class" />

  <rdfs:range rdf:resource="http://www.w3.org/1999/02/22-rdf-syntax-
ns#Property" />

</rdf:Property>
```



Issue 360:

*Making explicit the source expression that influenced an instance of F1 Work by listing the fully articulated path*

F27 Work Creation

NEW

## **F27 Work Creation**

Subclass of: E65 Creation

Scope note: This class comprises activities by which instances of F1 Work come into existence. An instance of F27 Work Creation can serve to document the period a work was coming into existence and the circumstances of it, when these are known.

An instance of F27 Work Creation marks the initial creation of an instance of F1 Work through expressions or other externalisations that are sufficiently elaborated so that the characteristic conceptual identity of the work could be recognized as existing.

In many cases this will coincide with the first known complete externalisation of an expression of the work. In other cases, the initial creation of an instance of F1 Work may be inferred from multiple, or later, expressions or other forms of evidence. For instance, commissioning of a work may explicitly be agreed on after the presentation of an already complete and detailed elaboration of the work that was not made public. Performances may be prior to written expressions, as in the case of Shakespeare's works.

The work, as an intellectual construction, may evolve from its initial creation onwards, until the last known expression of it.

An instance of E39 Actor with which a work is associated through the chain of properties F1 Work. *R16i was created by*: F27 Work Creation. *P14 carried out by (performed)*: E39 Actor corresponds to the notion of the "creator" of the work.

In the situation where an expression of one instance of F1 Work serves as source material for the creation of the first expression of a new instance of F1 Work, the direct relationship between the works is indicated using the property *R2 is derivative of (has derivative)* between the two instances of F1 Work. The link to the specific source expression is indicated with the property *P16 used specific object (was used for)* using the path: F1 Work(1). *R3 is realised in*: F2 Expression(1). *P16i was used for*: F27 Work Creation. *R16 created*: F1 Work(2).

Examples:

- Agatha Christie creating 'Murder on the Orient Express'.
- Mary Shelley creating 'Frankenstein, or, The Modern Prometheus'.
- Dante creating the poem 'Divina Commedia'.
- William Shakespeare creating 'The Tragedy of Hamlet, Prince of Denmark'.
- René Goscinny and Albert Uderzo's (collaboratively) creating 'Astérix le Gaulois'.
- Ludwig van Beethoven's composing his Symphony No. 9.
- Johan Sebastian Bach composing the 'Goldberg variations'.

- The making of ‘Jules et Jim’, directed by François Truffault.
- The making of ‘Psycho’, directed by Alfred Hitchcock.
- Auguste Rodin creating ‘Le Penseur’ (The Thinker).
- Picasso creating ‘Guernica’.

Properties: R16 created (was created by): F1 Work

OLD

## F27 Work Creation

Subclass of: E65 Creation

Scope note: This class comprises activities by which instances of F1 Work come into existence. An instance of F27 Work Creation can serve to document the period a work was coming into existence and the circumstances of it, when these are known.

An instance of F27 Work Creation marks the initial creation of an instance of F1 Work through expressions or other externalisations that are sufficiently elaborated so that the characteristic conceptual identity of the work could be recognized as existing.

In many cases this will coincide with the first known complete externalisation of an expression of the work. In other cases, the initial creation of an instance of F1 Work may be inferred from multiple, or later, expressions or other forms of evidence. For instance, commissioning of a work may explicitly be agreed on after the presentation of an already complete and detailed elaboration of the work that was not made public. Performances may be prior to written expressions, as in the case of Shakespeare’s works.

The work, as an intellectual construction, may evolve from its initial creation onwards, until the last known expression of it.

An instance of E39 Actor with which a work is associated through the chain of properties F1 Work. *R16i was created by: F27 Work Creation. P14 carried out by (performed): E39 Actor* corresponds to the notion of the “creator” of the work.

In the situation where an expression of one instance of F1 Work serves as source material for the creation of the first expression of a new instance of F1 Work, the relationship between the works is indicated using the property *R2 is derivative of (has derivative)* between the two instances of F1 Work.

Examples:

- Agatha Christie creating ‘Murder on the Orient Express’.
- Mary Shelley creating ‘Frankenstein, or, The Modern Prometheus’.
- Dante creating the poem ‘Divina Commedia’.
- William Shakespeare creating ‘The Tragedy of Hamlet, Prince of Denmark’.
- René Goscinny and Albert Uderzo’s (collaboratively) creating ‘Astérix le Gaulois’.
- Ludwig van Beethoven’s composing his Symphony No. 9.
- Johan Sebastian Bach composing the ‘Goldberg variations’.

- The making of ‘Jules et Jim’, directed by François Truffaut.
- The making of ‘Psycho’, directed by Alfred Hitchcock.
- Auguste Rodin creating ‘Le Penseur’ (The Thinker).
- Picasso creating ‘Guernica’.

Properties: R16 created (was created by): F1 Work

R77 accompanies or complements (is accompanied or complemented by)

NEW

**R77 accompanies or complements (is accompanied or complemented by)**

Domain: F1 Work

Range: F1 Work

Shortcut of: F1 Work. P19i was made for: E7 Activity. P19 was intended use of: F1 Work

Quantification: many to many (0,n:0,n)

Scope note: This property associates one instance of F1 Work with another instance of F1 Work which is intended to accompany it or to function as a complement for it. This property is neither transitive nor intransitive. It is generally not symmetric and it is irreflexive.

In many but not all cases, one of the instances of F1 Work is primary and can be used without the other work, while the other is secondary and depends on the first work (such as a work that is a concordance for another work).

In some cases a work may have been created to accompany or complement a specific expression of another work. The link to the source expression can be indicated using the property *P16 used specific object (was used for)* using the path: F1 Work(1). *R3 is realised in*: F2 Expression(1). *P16i was used for*: F27 Work Creation. *R16 created*: F1 Work(2). (Illustrate with an example of a concordance: such as in FL’s comment?)

Examples:

- Leigh Lowe’s Prima Latina: an introduction to Christian Latin. Teacher manual *accompanies or complements* Leigh Lowe’s Prima Latina: an introduction to Christian Latin. Student book.
- Eric Gill’s set of illustrations for the Song of Songs *accompanies or complements* the Song of Songs in the 1931 publication by the Cranach Press.
- The periodical Applied economics quarterly (ISSN 1611-6607) *is accompanied or complemented by* the periodical Applied economics quarterly. Supplement (ISSN 1612-2127).

OLD

**R77 accompanies or complements (is accompanied or complemented by)**

Domain: F1 Work

Range: F1 Work

Shortcut of: F1 Work. P19i was made for: E7 Activity. P19 was intended use of: F1 Work

Quantification: many to many (0,n:0,n)

Scope note: This property associates one instance of F1 Work with another instance of F1 Work which is intended to accompany it or to function as a complement for it. This property is neither transitive nor intransitive. It is generally not symmetric and it is irreflexive.

In many but not all cases, one of the instances of F1 Work is primary and can be used without the other work, while the other is secondary and depends on the first work (such as a work that is a concordance for another work).

Examples:

- Leigh Lowe's Prima Latina: an introduction to Christian Latin. Teacher manual *accompanies or complements* Leigh Lowe's Prima Latina: an introduction to Christian Latin. Student book.
- Eric Gill's set of illustrations for the Song of Songs *accompanies or complements* the Song of Songs in the 1931 publication by the Cranach Press.
- The periodical Applied economics quarterly (ISSN 1611-6607) *is accompanied or complemented by* the periodical Applied economics quarterly. Supplement (ISSN 1612-2127).

*Teasing apart R10 has member and R67 has part*

Proposal for R10 has member (to be redrafted and put in an evote)

**R10 has member (is member of)**

Domain: F1 Work

Range: F1 Work

Subproperty of: E89 Propositional Object. P148 has component (is component of): E89 Propositional Object

Superproperty of: F1 Work. R67 has part (is part of): F1 Work

Quantification: many to many (0,n:0,n)

Scope note: This property associates an instance of F1 Work with another instance of F1 Work that forms a part of it. In contrast to its subproperty *R67 has part (is part of)*, the property *R10 has member (is member of)* may, for instance, also associate with the overall instance of F1 Work free translations, adaptations and other derivative works that do not form a logical whole with sibling parts. This property is transitive, asymmetric and irreflexive.

An instance of F1 Work may neither directly nor indirectly be a member of itself. Instances of F1 Work that are not members of one another may not share a common member.

Examples:

- Auguste Rodin's 'La Porte de l'Enfer' (F1) *has member* Auguste Rodin's 'Le penseur'(F1).

Proposal for R67 has part (forms part of) –was not discussed

**R67 has part (forms part of)**

Domain: F1 Work

Range: F1 Work

Subproperty of: F1 Work. R10 has member (is member of): F1 Work

Quantification: many to many (0,n:0,n)

Scope note: This property associates an instance of F1 Work with another instance of F1 Work that forms part of it in a complementary role to other sibling parts, conceived at some point in time to form together a logical whole, such as the parts of a trilogy. This property is transitive, asymmetric and irreflexive.

In contrast, the property *R10 has member (is member of)* may, for instance, also associate with the overall instance of F1 Work free translations, adaptations and other derivative works that do not form a logical whole with sibling parts.

Examples:

- Dante Alighieri's textual work entitled 'Divina Commedia' (F1) *has part* Dante Alighieri's textual work entitled 'Inferno' (F1).
- Miguel de Cervantes' textual work entitled 'Don Quixote' (F1) *has part* Miguel de Cervantes' textual work entitled 'El ingenioso hidalgo Don Quixote de la Mancha' (F1).
- Miguel de Cervantes' textual work entitled 'Don Quixote' (F1) *has part* Miguel de Cervantes' textual work entitled 'Segunda Parte del Ingenioso Cavallero Don Quixote de la Mancha' (F1).
- J.R.R. Tolkien's textual work 'The Lord of the Rings' (F1) *has part* J.R.R. Tolkien's textual work 'The Two Towers' (F1).
- Cormac McCarthy's textual work 'The Border Trilogy' (F1) *has part* Cormac McCarthy's textual work 'All the Pretty Horses' (F1).
- Giovanni Battista Piranesi's graphic work entitled 'Carceri' (F1) *has part* Giovanni Battista Piranesi's graphic work entitled 'Carcere XVI: the pier with chains' (F1)
- Ludwig van Beethoven's musical work entitled 'Symphony No. 9' (F1) *has part* Ludwig van Beethoven's musical work 'Finale' (4<sup>th</sup> movement) (F1).

### *Expressing Intended Audiences*

NEW (decision of 44<sup>th</sup> SIG meeting)

#### **P103 was intended for (was intention of)**

Domain: E71 Human-Made Thing

Range: E55 Type

Quantification: many to many (0,n:0,n)

Scope note: This property links an instance of E71 Human-Made Thing to an instance of E55 Type of usage or audience. It creates a relation between specific human-made things, both physical and immaterial, to Types. This property can be used to specify intended methods and techniques of use or to characterize the intended audience by indicating a type of personal characteristic that everyone falling into the target audience has. Note: A link between specific human-made things and a specific identified use activity should be expressed using *P19 was intended use of (was made for)*.

Examples:

- This plate (E22) *was intended for* being destroyed at a wedding reception (E55). (fictitious)
- Reading for life, a first book for adults and their tutors (E28) *was intended for* adult literacy learners in the English language (E55). (Allen, 1987)

- Piglet has a bath (E28), published on sealed plastic pages, *was intended for* young children having a bath (E55). (Milne & Shepard, 1998).

In First Order Logic:

$$P103(x,y) \Rightarrow E71(x),$$

$$P103(x,y) \Rightarrow E55(y)$$

OLD (ignoring the decision of the 44<sup>th</sup> SIG meeting)

### **P103 was intended for (was intention of)**

Domain: E71 Human-Made Thing

Range: E55 Type

Quantification: many to many (0,n:0,n)

Scope note: This property links an instance of E71 Human-Made Thing to an instance of E55 Type describing its intended usage.

It creates a relation between specific human-made things, both physical and immaterial, to types of intended methods and techniques of use. Note: A link between specific human-made things and a specific use activity should be expressed using *P19 was intended use of (was made for)*.

Examples:

- This plate (E22) *was intended for* being destroyed at a wedding reception (E55). (fictitious)

In First Order Logic:

$$P103(x,y) \Rightarrow E71(x),$$

$$P103(x,y) \Rightarrow E55(y)$$

594: Semantically replace Recording Event and Externalization Event

*F31 Performance*

NEW

### **F31 Performance**

Subclass of: E7 Activity

Scope note: This class comprises activities where an instance of F1 Work is presented or communicated directly or indirectly to an audience, such as a theatrical play, a musical work, or a choreographic work.

Performances can be identified at various levels of granularity, but an instance of F31 Performance is always associated with a single identified instance of F1 Work. An instance of F31 Performance may consist of other instances of F31 Performance as parts, such as piano concerto that has multiple movements. In addition, a complete run of equivalent performances of the same work can also be seen as an instance of F31 Performance, with the individual performances as parts.

Activities that include performing multiple individual works, e.g. that are put together as a program for a show or concert, but where the activity as a whole is not associated with an instance

of F1 Work, should be represented as instances of E7 Activity consisting of individual F31 Performances as parts (the property *P9 consists of (forms part of)* expresses the relationship).

Instances of F31 Performance may be created according to specific staging directions, based on specific known instances of F2 Expression (such as translations), or be influenced by or include elements that relate to different works than the single work the performance is dominated by. This can be documented using the CRM property *P16 used specific object (was used for)* or *P15 was influenced by (influenced)*.

Examples:

- The performance of a Yiddish translation of the textual work entitled ‘King Lear’, as directed by Sergei Radlov, in Moscow, at the Moscow State Jewish Theatre, on February 10, 1935.
- The performance of the ballet entitled ‘Rite of spring’, as choreographed by Pina Bausch, in Avignon, at the Popes’ Palace, on July 7, 1995.
- The performance of the operatic work entitled ‘Dido and Aeneas’, as directed by Edward Gordon Craig and conducted by Martin Shaw, in London, Hampstead Conservatoire, on May 17, 18, and 19, 1900.
- The performance of Verdi’s La Traviata at the Salzburg Festival in 2005, that was staged by Willi Decker and directed by Brian Large featuring Anna Netrebko and Rolando Villazón.

Properties: R80 performed (is performed in): F1 Work.

OLD

## F31 Performance

Subclass of: E7 Activity

Scope note: This class comprises activities that follow the directions of a plan for any kind of performance, such as a theatrical play, an expression of a choreographic work or a musical work; i.e., they are intended to communicate directly or indirectly to an audience.

Such activities can be identified at various levels of granularity, and can be contiguous or not. Any individual performance (with or without intermissions) is a single instance of F31 Performance. In addition, a complete run of performances can also be seen as an instance of F31 Performance, with individual performances as parts. A complete run of performances may comprise an original run plus any of its extensions and tours.

Note that a performance plan may be more or less elaborate, and may even foresee just improvisation.

Examples:

- performing the first performance of a Yiddish translation of the textual work entitled ‘King Lear’, as directed by Sergei Radlov, in Moscow, at the Moscow State Jewish Theatre, on February 10, 1935 [individual performance]
- performing the ballet entitled ‘Rite of spring’, as choreographed by Pina Bausch, in Avignon, at the Popes’ Palace, on July 7, 1995 [individual performance]
- performing the operatic work entitled ‘Dido and Aeneas’, as directed by Edward Gordon Craig and conducted by Martin Shaw, in London, Hampstead Conservatoire, on May 17, 18, and 19, 1900 [run of performances]

Properties: R66 included performed version of (had a performed version through): E89 Propositional Object

[NEW PROPERTY – R80 performed \(is performed in\)](#)

**R80 performed (is performed in)**

Domain: F31 Performance

Range: F1 Work

Subproperty of: E70 Thing. P130 shows features of (features are also found on): E70 Thing

Quantification: many to one, necessary, dependent (1,1:1,n)

Scope note: This property associates an instance of F31 Performance with an instance of F1 Work.

This property is used to express the association between an instance of F31 Performance and the instance of F1 Work it conveys.

Examples:

- The performance of ‘Hamlet’ on 17 June 1909 in Berlin, Deutsches Theater, by Alexander Moissi, directed by Max Reinhardt (F31) *performed* William Shakespeare’s work ‘Hamlet’ (F1).
- The performance (at the Salzburg Festival in 2005) of Verdi’s La Traviata that was staged by Willy Decker and directed by Brian Large featuring Anna Netrebko and Rolando Villazón (F31) *performed* Giuseppe Verdi’s work La Traviata (F1).

[NEW PROPERTY –R81 recorded \(is recorded in\)](#)

**R81 recorded (is recorded in)**

Domain: F28 Expression Creation

Range: F31 Performance

Subproperty of:

Quantification: many to one (0,n:0,1)

Scope note: This property associates an instance of F28 Expression Creation with an instance of F31 Performance.

This property allows for the documentation of the association that exists between the outcome of an instance of F28 Expression Creation, such as a performance recording, and the instance of F31 Performance that it is a recording of. For documenting performances that are more integral and planned parts of an expression creation (such as the recording of a performance solely done for the purpose of audio or video productions), the use of *P9 consists of (forms part of)* is more specific (and appropriate).

Examples:

- The Hyperion production (for CD release) of Angela Hewitt performing ‘Goldberg Variations’ (F28) *recorded* Angela Hewitt’s performance of the ‘Goldberg Variations’ in Christuskirche (Berlin) on 14-17 December 2015 (F31).
- The Deutsche Grammophon video production of Verdi’s La Traviata from the Salzburg Festival in 2005 (F28) *recorded* the live performance of La Traviata that was staged by Willy Decker and directed by Brian Large, featuring Anna Netrebko and Rolando Villazón (F31).
- The Deutsche Grammophon audio production of Verdi’s La Traviata from the Salzburg Festival in 2005 (F28) *recorded* the live performance of La Traviata performed by the Vienna Philharmonic, conducted by Carlo Rizzi, featuring Anna Netrebko and Rolando Villazón (F31).



Issue 613:

Shortcuts subsection of the Introduction section of CIDOC CRM redrafting

*NEW*

## ***Shortcuts***

Some properties are declared as shortcuts of longer, more comprehensively articulated paths that connect the same domain and range classes as the shortcut property via one or more intermediate classes. For example, the property E18 Physical Thing. *P52 has current owner (is current owner of)*: E39 Actor, is a shortcut for a fully articulated path from E18 Physical Thing through E8 Acquisition to E39 Actor. We distinguish the following terms:

**Shortcut:** An instance of the fully-articulated path always implies an instance of the shortcut property. However, the converse may not be true; an instance of the fully-articulated path cannot always be inferred from an instance of the shortcut property.

**Inverse shortcut:** An instance of the shortcut property always implies an instance of the fully-articulated path. However, the converse may not be true; an instance of the shortcut property cannot always be inferred from an instance of the fully-articulated path.

**Strong shortcut:** An instance of the fully-articulated path always implies an instance of the strong shortcut property and an instance of the fully-articulated path can always be inferred from an instance of the strong shortcut property.

The class E13 Attribute Assignment allows for the documentation of how the assignment of any property came about, and whose opinion it was, even in cases of properties not explicitly characterised as “shortcuts”.

*OLD*

## ***Shortcuts***

Some properties are declared as shortcuts of longer, more comprehensively articulated paths that connect the same domain and range classes as the shortcut property via one or more intermediate classes. For example, the property E18 Physical Thing. *P52 has current owner (is current owner of)*: E39 Actor, is a shortcut for a fully articulated path from E18 Physical Thing through E8 Acquisition to E39 Actor. An instance of the fully-articulated path always implies an instance of the shortcut property. However, the inverse may not be true; an instance of the fully-articulated path cannot always be inferred from an instance of the shortcut property inside the frame of the actual knowledge base.

The class E13 Attribute Assignment allows for the documentation of how the assignment of any property came about, and whose opinion it was, even in cases of properties not explicitly characterized as “shortcuts”.

Issue 583:

*Sxx2 Relative Dimension (isA E54 Dimension)*

### **Sxx2 Relative Dimension**

Subclass of:

E54 Dimension

Superclass of:

Sxx3 Angle

Scope note:

This class comprises quantifiable properties that can be measured by some calibrated means and were holding between two or more distinct instances of S15 Observable Entity for some time.

Typical examples include relative distances between physical things or temporal distances between events such as athletes arriving at a goal or the time elapsed from production in thermoluminescence dating.

Generally, all kinds of quantifiable properties holding for a single item in isolation can be compared relative to the same of another item. Depending on the methods, such relative dimensions often constitute important primary observational data for calculating absolute values rather than being computational results from absolute values, an example being relative barometric measurements of altitude during expeditions.

Examples:

- the distance of the Moon from Earth [The distance to the Moon can be measured with millimeter precision.] ([https://en.wikipedia.org/wiki/Lunar\\_Laser\\_Ranging\\_experiment](https://en.wikipedia.org/wiki/Lunar_Laser_Ranging_experiment))

In first-order logic:

$$Sxx2(x) \Rightarrow E54(x)$$

Properties:

Oxx6 is relative to (has relative dimension): S15 Observable Entity

[Oxx6 is relative to \(has relative dimension\) \(IsA O12 has dimension \(is dimension of\)\)](#)

**Oxx6 is relative to (has relative dimension)**

Domain:

Sxx2 Relative Dimension

Range:

S15 Observable Entity

Subproperty of:

E54 Dimension. O12 has dimension (is dimension of): S15 Observable Entity

Quantification:

many to many, necessary (2:n,0:n)

Scope note:

This property associates an instance of Sxx2 Relative Dimension with one of the instances of S15 Observable Entity between which it was holding.

Examples:

- The Moon *is relative to* the distance between the Moon and the Earth [The distance to the Moon can be measured with millimeter precision.] ([https://en.wikipedia.org/wiki/Lunar\\_Laser\\_Ranging\\_experiment](https://en.wikipedia.org/wiki/Lunar_Laser_Ranging_experiment))
- The Earth *is relative to* the distance between the Moon and the Earth ([https://en.wikipedia.org/wiki/Lunar\\_Laser\\_Ranging\\_experiment](https://en.wikipedia.org/wiki/Lunar_Laser_Ranging_experiment))

In first-order logic:

$$Oxx6(x,y) \Rightarrow E54(x)$$

$O_{xx6}(x,y) \Rightarrow S15(y)$   
 $O_{xx6}(x,y) \Rightarrow O12(y,x)$

*Sxx3 Angle (IsA Sxx2 Relative Dimension)*

### **Sxx3 Angle**

Subclass of:

Sxx2 Relative Dimension

Scope note:

This class comprises quantifiable angles that can be measured by some calibrated means and held between a spot on some instance of S15 Observable Entity forming the geometric vertex and two directions to the position of some other instances of S15 Observable Entity.

Typical examples include results of measurements with theodolites, sextants or compasses.

Examples:

■

In first-order logic:

$S_{xx3}(x) \Rightarrow S_{xx2}(x)$

Properties:

Oxx7 has vertex: S15 Observable Entity

Oxx7 has vertex (is vertex of) (IsA Oxx6 is relative to (has relative dimension))

### **Oxx7 has vertex (is vertex of)**

Domain:

Sxx3 Angle

Range:

S15 Observable Entity

Subproperty of:

Sxx2 Relative Dimension. Oxx6 is relative to (has relative dimension): S15 Observable Entity

Quantification:

many to one, necessary (1:1,0:n)

Scope note:

This property associates an instance of Sxx3 Angle with the instance of S15 Observable Entity that includes in its extent the vertex of the former.

Typical examples are respective marked spots on Earth or a ship where a theodolite, a sextant or a compass (<https://en.wikipedia.org/wiki/Theodolite>) is positioned during a position measurement.

Examples:

■ historical example would be useful

In first-order logic:

$$O_{xx7}(x,y) \Rightarrow S_{xx3}(x)$$

$$O_{xx7}(x,y) \Rightarrow S_{15}(y)$$

$$O_{xx7}(x,y) \Rightarrow O_{xx6}(x,y)$$

Issue 625:

*NEW*

### **O13 triggered (was triggered by)**

Domain:

E5 Event

Range:

E5 Event

Quantification:

many to many (0,n:0,n)

Scope note:

This property associates an instance of E5 Event that triggered another instance of E5 Event with the latter. It identifies the interaction between events: an event can activate (trigger) other events in a target system that is in a situation of sustained tension, such as a trap or an unstable mountain slope giving way to a land slide after a rain or earthquake

The distinction of a triggering event A from the triggered event B lies in their difference of nature. The starting of B is the result of an interaction of material constituents of A with material constituents of B. However, B does not necessarily continue the kinds of processes of A. Therefore, the triggering event A must spatiotemporally overlap with the initial time and area of the triggered event B. Any subsequent phenomena must initiate from this area and time and not from multiple independent areas.

Examples:

- The earthquake of Parnitha in 1999 (E5) *triggered* the rotational landslide that was observed along the road on the same day (E5). (fictitious)
- The explosion at the Montserrat massif in 2007 (E5) (near Barcelona, Spain) *triggered* the rock fall event (E5) which happened on 2007-02-14 (Vilajosana et al., 2008).
- The 1966 flood in Florence (E5) *triggered* mould growth on books (E5) stored in flooded library rooms (Rubinstein, N., 1966)

In First Order Logic:

$$O_{13}(x,y) \Rightarrow E5(x)$$

$$O_{13}(x,y) \Rightarrow E5(y)$$

*OLD*

### **O13 triggered (was triggered by)**

Domain:

E5 Event

Range:

E5 Event

Quantification:

many to many (0,n:0,n)

Scope note:

This property associates an instance of E5 Event that triggered another instance of E5 Event with the latter. It identifies the interaction between events: an event can activate (trigger) other events in a target system that is in a situation of sustained tension, such as a trap or an unstable mountain slope giving way to a land slide after a rain or earthquake. In that sense the triggering event is interpreted as a cause. However, the association of the two events is based on their temporal proximity, with the triggering event ending when the triggered event starts.

Examples:

- The earthquake of Parnitha in 1999 (E5) *triggered* the rotational landslide that was observed along the road on the same day (E5). (fictitious)
- The explosion at the Montserrat massif in 2007 (E5) (near Barcelona, Spain) *triggered* the rock fall event (E5) which happened on 2007-02-14 (Vilajosana et al., 2008).
- The 1966 flood in Florence (E5) *triggered* mould growth on books (E5) stored in flooded library rooms (Rubinstein, N., 1966)

In First Order Logic:

$O13(x,y) \Rightarrow E5(x)$

$O13(x,y) \Rightarrow E5(y)$

$O13(x,y) \Rightarrow P182(x,y)$

Issue 556:

*Terms to be used in migration paths for deprecated classes*

Deprecated Class	Migration Instruction	Type	Scope note	SIG agreed recommendation
E38 Image	use E36 Visual Item. P2 has type: "Image"		<b>CRM Note:</b> This class comprises distributions of form, tone and colour that may be found on surfaces such as photos, paintings, prints and sculptures or directly on electronic media.	no recommendation because the AAT does not provide useful concepts

E40 Legal Body	use E74 Group	<p>ID: <b>300025969</b>  Page Link:  <a href="http://vocab.getty.edu/page/aat/300025969">http://vocab.getty.edu/page/aat/300025969</a></p> <p><b>corporations</b> (companies, &lt;business enterprises by form&gt;, ... Organizations (hierarchy name))</p> <hr/> <p>ID: <b>300386361</b>  Page Link:  <a href="http://vocab.getty.edu/page/aat/300386361">http://vocab.getty.edu/page/aat/300386361</a></p> <p><b>corporate bodies</b> (organizations (groups), Organizations (hierarchy name))</p>	<p><b>AAT Note:</b> Groups of persons, commonly formed as business enterprises, considered in law as legal persons having an existence and rights and duties distinct from those of the individuals who form them. For unincorporated groups of persons contractually associated as joint principals in business, use "partnerships."</p> <hr/> <p><b>AAT Note:</b> Organized, identifiable groups of people working together in a particular place and within a defined period of time, including legally incorporated entities and people more loosely bound, such as an artist's workshop, who work together to perform duties or activities. To refer specifically to incorporated groups that are considered in law as legal persons having an existence and rights and duties distinct from those of the individuals who form them, use "corporations."</p>	<p>provide a list of loose recommendations from AAT that are likely to match kinds of groups documented in projects using the CRM.</p> <p>[open HW: the list to be expanded with other AAT concepts further specifying the kind of groups]</p>
E44 Place Appellation	use E41 Appellation			no recommendation
E45 Address	use E41 Appellation. P2 has type: "Address"	<p>ID: 300386983  Page Link:  <a href="http://vocab.getty.edu/page/aat/300386983">http://vocab.getty.edu/page/aat/300386983</a></p> <p><b>street addresses</b> (geographic concepts, physical sciences concepts, ... Associated Concepts (hierarchy name))</p>	<p><b>AAT Note:</b> Particulars of the place where a person, organization, building, or monument can be found on a street or other thoroughfare; typically consisting of a number, street name, the name of the administrative area (a town or district). May also include a postcode, as the street address may also be the "mailing address."</p>	
E46 Section Definition	use E41 Appellation			no recommendation because the AAT does not provide useful concepts

E47 Spatial Coordinates	use E94 Space Primitive			no recommendation
E48 Place Name	use E41 Appellation. P2 has type: "place names"	ID: 300404655 Page Link: <a href="http://vocab.getty.edu/page/aat/300404655">http://vocab.getty.edu/page/aat/300404655</a> <b>place names</b> (names, <names and related concepts>, ... Associated Concepts (hierarchy name))	<b>AAT Note:</b> Proper names of geographic locations, such as a nations, empires, towns, villages, hills, or lakes.	
E49 Time Appellation	use E41 Appellation.	ID: 300404439 Page Link: <a href="http://vocab.getty.edu/page/aat/300404439">http://vocab.getty.edu/page/aat/300404439</a> <b>dates (spans of time)</b> (<dates and dating systems>, multidisciplinary concepts, Associated Concepts (hierarchy name))	<b>AAT Note:</b> Years, or spans of time, periods, seasons, during which something lasts; the duration or term of existence or during which something happened or is to happen.	[open HW]: a time appellation is not necessarily a date, it can be a period associated with the reign of an emperor or can be identified by some other feature
E50 Date	use E61 Time Primitive			no recommendation

E51 Contact Point	use E41 Appellation. P2 has type: "Contact Point"	<p>ID: 300435690</p> <p>Page Link:  <a href="http://vocab.getty.edu/page/aat/300435690">http://vocab.getty.edu/page/aat/300435690</a></p> <p><b>addresses (communications concepts)</b></p>	<p><b>AAT Note:</b> Designations for locations, either physical or virtual, where a person, corporate body, physical object, Web site, or other thing may be contacted or found.</p> <p><b>CRM Note:</b> This class comprises identifiers employed, or understood, by communication services to direct communications to an instance of E39 Actor. These include E-mail addresses, telephone numbers, post office boxes, Fax numbers, URLs etc. Most postal addresses can be considered both as instances of E44 Place Appellation and E51 Contact Point. In such cases the subclass E45 Address should be used.</p> <p>URLs are addresses used by machines to access another machine through an http request. Since the accessed machine acts on behalf of the E39 Actor providing the machine, URLs are considered as instances of E51 Contact Point to that E39 Actor.</p>	
E75 Conceptual Object Appellation	use E41 Appellation			no recommendation



E82 Actor Appellation	use E41 Appellation	<p>ID: 300266386</p> <p>Page Link: <a href="http://vocab.getty.edu/page/aat/300266386">http://vocab.getty.edu/page/aat/300266386</a></p> <p><b>personal names</b> (names, &lt;names and related concepts&gt;, ... Associated Concepts (hierarchy name))</p>	<p><b>AAT Note:</b> The name by which an individual person is identified or known, as distinguished from names for corporate bodies or other entities.</p>	<p>[open HW] the list to be expanded with other AAT concepts further specifying the actor type -relates to the discussion concerning legal bodies.]</p>
		<p>ID: 300445020</p> <p>Page Link: <a href="http://vocab.getty.edu/page/aat/300445020">http://vocab.getty.edu/page/aat/300445020</a></p> <p><b>corporate names</b> (names, &lt;names and related concepts&gt;, ... Associated Concepts (hierarchy name))</p>		
E84 Information Carrier	use E22 Human-Made Object. P2 has type: "Information Carrier"	<p>ID: 300220751</p> <p>Page Link: <a href="http://vocab.getty.edu/page/aat/300220751">http://vocab.getty.edu/page/aat/300220751</a></p> <p><b>information forms (objects)</b> (Information Forms (hierarchy name), Visual and Verbal Communication (hierarchy name))</p>	<p><b>AAT Note:</b> Types of textual, graphic, electronic, or physical items having the primary and original purpose to record or convey specific information. For forms in the sense of a document having blanks to be filled in, use "forms (documents)."</p> <p><b>CRM Note:</b> This class comprises all instances of E22 Man-Made Object that are explicitly designed to act as persistent physical carriers for instances of E73 Information Object.</p>	

*Type restrictions of existing classes and typed properties*

Classes

CRM Class	Type specification	Type recommendation	Scope note	SIG agreed recommendation
E4 Period	"geopolitical unit"			[open HW: MD is working on interpretations of geopolitical units]

E10 Transfer of Custody	“physical possession”:	ID: <b>300411616</b> Page Link: <a href="http://vocab.getty.edu/page/aat/300411616">http://vocab.getty.edu/page/aat/300411616</a> <b>possession (property right)</b> (property rights, property-related concepts, ... Associated Concepts (hierarchy name))	AAT Note: The right or condition of visible power or control over real or other property, defined by the intention to use or to hold it against others, typically as distinct from, or at least not synonymous with, lawful ownership.	no recommendation wrt “legal responsibility” and “illegal possession” mentioned in the scope note.
E15 Identifier Assignment	“preferred identifier assignment”	CRM Thesaurus term	CRM Note: [...] The fact that an identifier is a preferred one for an organisation can be expressed by using the property E1 CRM Entity. <i>P48 has preferred identifier (is preferred identifier of): E42 Identifier. It can better be expressed in a context independent form by assigning a suitable E55 Type, such as “preferred identifier assignment”, to the respective instance of E15 Identifier Assignment via the P2 has type property.</i>	[open HW: provide the scope note to further specify the preferred identifier assignment]
E34 Inscription	“alphabet”	[ISO 15924] Alphabetical list of four-letter script codes Page Link: <a href="https://www.unicode.org/iso15924/iso15924-codes.html">https://www.unicode.org/iso15924/iso15924-codes.html</a>	CRM Note: [...] The transcription of the text can be documented in a note by P3 has note: E62 String. The alphabet used can be documented by P2 has type: E55 Type. This class does not intend to describe the idiosyncratic characteristics of an individual physical embodiment of an inscription, but the underlying prototype. [...]	
E57 Material				no recommendation wrt. the type specification of materials.
E58 Measurement Unit	“measurement unit”	[ISO 80000-1:2009] Quantities and units – Part 1: General Page Link: <a href="https://www.iso.org/standard/30669.html">https://www.iso.org/standard/30669.html</a>		

Typed properties

Typed property	Property -Domain	Class - Range	Type in CRM scope note	Type recommendation	Scope Note	SIG agreed recommendation
P3.1 has type	E1 CRM Entity. P3 has note: E62 String	E55 Type	“type of encoding”, “type of note”			no recommendation
P14.1 in the role of	E7 Activity. P14 carried out by (performed): E39 Actor	E55 Type	“type of role”			no recommendation
P16.1 mode of use	E7 Activity. P16 used specific object (was used for): E70 Thing	E55 Type	“type of use”			no recommendation
P19.1 mode of use	E7 Activity. P19 was intended use of (was made for): E71 Human-Made Thing	E55 Type	“type of use”			no recommendation
P62.1 mode of depiction	E24 Physical Human-Made Thing. P62 depicts (is depicted by): E1 CRM Entity	E55 Type				[open HW: scope note needs updating before a type recommendation is given]  [open HW: consult lookup Iconclass for mode of description]

P67.1 has type	E89 Propositional Object. P67 refers to (is referred to by): E1 CRM Entity	E55 Type				[open HW: scope note needs updating before a type recommendation is given]
P138.1 mode of representation	E36 Visual Item. P138 represents (has representation): E1 CRM Entity	E55 Type				[open HW: scope note needs updating before a type recommendation is given]
P69.1 has type	E29 Design or Procedure. P69 has association with (is associated with): E29 Design or Procedure	E55 Type	type of association			no recommendation
P102.1 has type	E71 Human-Made Thing. P102 has title (is title of): E35 Title	E55 Type	“type of title”	<p><b>ID:</b> 300417193</p> <p>Page Link: <a href="http://vocab.getty.edu/page/aat/300417193">http://vocab.getty.edu/page/aat/300417193</a></p> <p><b>titles (general, names)</b> (names, &lt;names and related concepts&gt;, ... Associated Concepts (hierarchy name))</p>	<p><b>AAT Note:</b> Words or phrases, often descriptive or evocative, used to identify or provide reference to a work, including physical works, performances, literary works, and conceptual works. May apply to individual items or works, or to groups or series of items, in any medium. Titles may also be initials, numbers, or symbols. Examples are titles or names of works of art and architecture. For numeric or alphanumeric IDs or codes for uniquely identifying a work, prefer "identification numbers." To refer specifically to titles printed or inscribed on a book or other object, such as on the title page, prefer "titles (partial documents).</p>	

P107.1 kind of member	E74 Group. P107 has current or former member (is current or former member of): E39 Actor	E55 Type	“type of member”			no recommendation
P144.1 kind of member	E85 Joining. P144 joined with (gained member by): E74 Group	E55 Type	“type of membership”			no recommendation
P130.1 kind of similarity	E70 Thing. P130 shows features of (features are also found on): E70 Thing	E55 Type	“type of similarity”			no recommendation
P139.1 has type	E1 CRM Entity. P139 has alternative form (is alternative form of): E41 Appellation	E55 Type	“type of alternative for”			no recommendation
P136.1 in the taxonomic role of	E83 Type Creation. P136 was based on (supported type creation of): E1 CRM Entity	E55 Type	“type of taxonomic role”			no recommendation
P137.1 in the taxonomic role	E1 CRM Entity. P137 exemplifies (is exemplified by): E55 Type	E55 Type	“type of taxonomic role”	GBIF (for natural history and ceramic classification) Nb. Other vocabularies may be suitable for things like archival description fonds.		
P189.1 has type		E55 Type				no recommendation

Issue 587:

The following document contains a collection of the research questions provided by more than 20 maritime historians from different research institutions and countries (Spain, Italy, France, Croatia, Greece) that participated in the SeaLiT Project.<sup>1</sup> SeaLiT Project is a European project in the field of maritime history (ERC Starting Grant, No 714437), which studies the transition from sail to steam navigation and its effects on seafaring populations in the Mediterranean and the Black Sea between the 1850s and the 1920s.

One of the main goals of the project has been to digitize and organize the primary archival documents<sup>2</sup> (that historians have collected and studied) which can provide answers or important relevant information regarding this crucial transition period in history, to integrate data for analysis and to ask questions that go beyond individual sources or research teams.<sup>3</sup>

The following research questions together with the real empirical data from the digitized historical records have been used to gradually model the SeaLiT ontology.<sup>4</sup>

More information about the overall data management workflow and the SeaLiT ontology is available at the following publications:

- P. Fafalios, Y. Marketakis, A. Axaridou, Y. Tzitzikas, M. Doerr, "*A Workflow Model for Holistic Data Management and Semantic Interoperability in Quantitative Archival Research*", Digital Scholarship in the Humanities (DSH), Oxford University Press, 2023. <https://doi.org/10.1093/llc/fgad018> (Preprint: <https://arxiv.org/pdf/2301.07676.pdf>)
- P. Fafalios, A. Kritsotaki, M. Doerr, "*The SeaLiT Ontology - An Extension of CIDOC-CRM for the Modeling and Integration of Maritime History Information*", ACM Journal on Computing and Cultural Heritage, 2023. <https://doi.org/10.1145/3586080> (Preprint: <https://arxiv.org/pdf/2301.04493.pdf>)

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<sup>1</sup> <https://sealitproject.eu/>

<sup>2</sup> The full archival corpus studied in SeaLiT is described in the project's web site <https://sealitproject.eu/archival-corpus>

<sup>3</sup> Part of these research questions have been also addressed by Delis, A. (2020). Seafaring Lives at the crossroads of Mediterranean maritime history. *International Journal of Maritime History*, 32(2), 464–478. <https://doi.org/10.1177/0843871420924240> .

<sup>4</sup> SeaLiT Ontology Specification <https://zenodo.org/record/6797750>