51st joint meeting of the CIDOC CRM SIG, 44th FRBR SIG and ISO/TC46/SC4/WG9. 12-15 October 2021

University of Oslo, Faculty of arts, Unit for digital documentation

Online on Zoom

Participants

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Tuesday, 12 October 2021

CIDOC-CRM Encoding (XML/HTML Declarations/ HTML Translations and Versioning/RDFs)
--presentation by Elias Tzortzakakis (ICS-FORTH)

Link to presentation

Discussion points:

- Translations of classes and properties are easier to keep track of compared to the introduction section, where long chunks of text have been moved around/merged/deleted/inserted in the document
- Working with XML proves faster than updating the classes and properties in Drupal. Following a decision on what version of Drupal to migrate to, the work with Drupal will resume. URIs for classes/properties in the 7.1.1 XML version should probably resolve to the representation in Drupal.
- This work would have been highly relevant when the SIG was putting together CIDOC CRM v7.1.1, and will be useful in the future, for editing newer versions.
- **Suggestion**: better navigation tool for graphs. Purpose: to extract the graphs and use them for examples (when discussing issues, this will be useful). To be made into a **new issue**
- No limitations re producing new versions of the CIDOC CRM in whatever format, given that it's possible to obtain the XML automatically from the document, and then derive all sorts of formats from it. Contact the TEI initiative communities, they have tools and expertise on converting XML to whatever format.
- **Suggestion**: design a workflow re. the derivation of byproducts from the master document (word document). Changes in the master document should also be implemented in the RDFs etc. **New issue** on using/adopting the tools to produce new versions in whatever format necessary.

New issue: Automatically produce graphs from the xml implementation of the CIDOC CRM
Automatically produce graphs from the xml implementation of the CIDOC CRM that Etz has presented

New issue: adoption and governance
Where to discuss the new tools and the processes they involve, how they affect the work undertaken in the translation initiative and what the relation btw the translation initiative and the CIDOC CRM SIG is.

New issue: technical means of the exchange
Where to discuss the technical means that permit the latest outputs of the work of the translation group to become published and accessible to the SIG and anyone interested in working with the CIDOC CRM.

Issue 555:
Policies for the RDFS derivations of the CIDOC CRM defined here

Subtopics discussed:

Inclusion of 'rdfs:label – subPropertyOf – P1 is identified by'
Vote that statements declaring subproperties of P1 is identified by, whose range is Literal in RDFS, be put to a separate RDFS module (one that extends the CRMbase RDFS module). Depending on one's implementation, they can use both files or only the CRMbase RDFS. The other file will also contain triplets for primitives (that are also isA E41 Appellation).
In favor: 10
Against: none
Decision: proceed as proposed.

Inclusion of 'owl:inverseOf' assertions in the RDFS

Proposal: Since using the inverseOf property in the same RDFS module will not cause platforms to crash, and in view of the fact that it is part of the model, it should be introduced.

GH, RS, PF would prefer this property to be put in one and the same module

Sds, DH, VA would prefer this property to be put in a different module

Vote to include 'owl:inverseOf' in theRDFS, but decide at a later stage if it's gonna be put in a different module or in the CRMbase
In favor: 8
Against: 1 (TV on the grounds of not wanting to mix ontologies and there being an OWL representation implementation underway)
Decision: proceed as proposed

Providing a JSON-LD context

Vote to proceed with automatically generating a JSON-LD context (together with the generation of the RDFS).
In favor: 10
Against: none
Decision: (i) proceed as proposed.

(ii) Start a new issue, where to determine the rules for automatically generating such a context.

(iii) Start a new issue on other serializations that it might useful to autogenerate for different audiences.

Providing a SHACL profile

Proposal: someone with the knowledge and background on creating SHACL profiles should be invited to share insights with the SIG –formal invitation to Miel Vander Sande to present this in a future SIG meeting (use cases etc.)

Nb. Connect to discussion on creating application profiles (see issues: 236, 364)

Change 'E41_E33_Linguistic_Appellation' to 'E33_E41_Linguistic_Appellation'

Proposal: keeping numbers of the numeric identifier in order.

Everyone in agreement.

Bringing Compatible models in line with this release

Proposal: once the family models are reviewed and updated to the point they 're stable (+style guide based on CIDOC CRM v7.1.1) to proceed by providing an RDFS implementation for these models as well.

Will be done in a separate issue per model

New issue: Defining rules for automatically generating a JSON-LD context

HW: Rs, Etz, PF

New issue: other serializations useful to autogenerate?

HW: Rs, Etz, PF, MD

Issue 560:

Proposal to formally close this issue.

Everything has been resolved now, except for the point that concerns the module for PC properties. PC properties will most likely be defined in a separate module, like for v.6.0 and v.6.2. A new PC property will have to be implemented (P189 approximates –P189.1 has type: E55 Type).

It should be discussed in a new issue, not a half-closed one.

Details on points addressed in the appendix.

Issue Closed

New issue: module for PC properties
PC properties will most likely be defined in a separate module, like for v.6.0 and v.6.2. A new PC property will have to be implemented (P189 approximates –P189.1 has type: E55 Type).

HW: PF, ETz to go through the previous versions of the module for PCs and then produce a new one.

Issue 460:
Subtopics discussed

Base URI namespace for classes and properties
Proposal: the base URI for classes and properties to not refer to the version. (http://www.cidoc-crm.org/cidoc-crm/ [+append relevant class/property]). Declare version using 'owl:versionInfo' in the RDFS file.

Vote on proposal
In favor: 7
Against: none
Outcome: Accepted

Nb.: given that there is no problem using an owl property in the RDFS to declare the version of CIDOC CRM, there should also not be a problem with using 'owl:inverseOf' for inverse property declarations either (see 555, above).

Having both unversioned and versioned ontology URIs.
Proposal: the unversioned URIs should point to the last official (community) version of CIDOC CRM. URIs for versions preceding the official community release, will all be versioned.

Discussion:

- The time between two official ISO versions stretches so long that ISO versions are bound to become irrelevant at some point. Official community versions also take a lot of time to implement, but not quite as much. It is preferable that the unversioned URIs point to the last official (community) version: RS, GB, SdS, VA, DH, MD in favor of this proposal
- discuss how to incorporate the changes that the ISO group perform in the work of the SIG –make it a new issue

Vote: on the proposal
In favor: 12
Against: none
Decision: accept proposal

Serving HTML or RDF (based on http request type)
Determine what the triples shown for each class/property URI are:

(a) complete star view (class/property URI appears as the subject OR object in the statement)
(b) direct statements (the class/property URI only occurs as the subject in the statement)

Vote on proposal (a) above
In favor: 9
Against: none
Outcome: accepted

Vote on proposal (b) above
In favor: 1
Against: 2
Outcome: rejected

Decision: Proposal (a) is accepted –show the complete star view

Renamed classes/properties

Proposal: when resolving a class/property (of a specific version) which has been renamed, we can point the user to the information about the renamed class (since semantics stay the same).

- For example, asking for http://www.cidoc-crm.org/cidoc-crm/E78_Collection
- users will get information about http://www.cidoc-crm.org/cidoc-crm/E78_Curated_Holding

 This needs to be done through HTTP redirect (303 response code)

Everyone in agreement –

Decision: proceed as proposed.

Deprecated classes

Two proposals on resolving URIs for deprecated classes/properties:

(a) deny access (response code: 404, 410)
(b) return them but mark them as deprecated (through annotation property 'owl:deprecated')

Discussion points:

- re option #2: if a system does not recognize owl statements, then it will not flag deprecated classes as such.
- Suggestion only to return deprecated classes/properties for versioned ontology URIs, on the grounds of the SIG having to provide access to every stable version it has produced (implementations have used them). But the versioned ontology URIs pointing to deprecated classes does not extend to what counts as the current official (community version).
    o However, if the versioned ontology has a class that's now deprecated, you only need to check if this class exists in the current implementation. If one requests a class from the current version that returns an error (in view of having been deprecated/renamed etc), then they need to check why this is the case. No need to declare the class deprecated.

Vote for (a) or (b) above:

In favor of (a): 4
In favor of (b): 4
Outcome: inconclusive

Decision: postpone the issue on the basis of not reaching the necessary consensus (no majority vote).
HW: PF to provide use cases that will help the SIG to ultimately resolve this. Specify what each scenario buys us into and what will be returned in each case for HTML or RDF.

Follow the same practice re. versioned/unversioned URIs for CRM family models

Everyone in agreement

New issue: How to incorporate the changes that the ISO group implement to the versioning pipeline of the SIG.

The issue stems from Issue 460. The idea is that ISO versions deviate from the official community versions in some aspects. The relation between the last official (community) version and the last ISO version needs to be determined and expressed in the versionless ontology URIs.

No HW assignment, possibly PF, RS, ETz, and others

Issue 528:

PM gave an outline of the Translation Guidelines document. Link to the document here: https://docs.google.com/document/d/1AJ7eC3p5NtDeVdlOlhlrB1PI9sCKhm0PTf3bcWZHSN8/edit?usp=sharing

SIG members are invited to provide **feedback** on the document drafted by the translation WG **by the end of October**.

> **Focal points:** propose a governance framework for the translation initiatives and help identify missing points that would help yield quality translations for CIDOC CRM

Issue 517:

(a) additional explanation of [+/-] reflexivity in the introduction

The SIG reviewed the definitions proposed by MD.

Vote on accepting both definitions and SdS to edit the text making sure that reflexivity only applies where it is meaningful and not trivially.
In favor: 7
Against: none
Outcome: accepted

DECISION: the definition of reflexivity is to substitute the existing one, and non-reflexivity will be added to the terminology list. Details in the Appendix

(b) exhaustive check on the list of properties for [+/-] transitivity, [+/-] reflexivity, [+/-] symmetry.

Proposal: Postpone reaching a decision for this sub-task, first give CEO some more time to go through the rest of the properties, then share the updated document with the SIG list (for feedback) by the end of October and then start an evote.

Link to the HW by CEO: https://docs.google.com/document/d/1g9dUpkbCAGrNf6a6u1pFA-M4z1HWRJBk/edit?usp=sharing&ouid=106527976073466803201&rtpof=true&sd=true

Everyone in agreement with this proposal.

HW: CEO to update the document of transitive properties, discuss it with MD and then share it through the SIG list

Issue 554 examples for E4 Period

The SIG reviewed the examples for E4 Period (HW by MD).

The SIG avoided reaching a decision in this meeting. The examples need to be reworked before they can be put to an evote / discussed anew in the next meeting.

Points raised:

(1) the example with Helsinki in particular is problematic. Instead of Helsinki: the case of Oslo makes a better example or villages that are lost to floods and moved elsewhere upon building a dam
(2) aside calling "The Capital of Russia" the "**administrative** Capital of Russia", there needs to be some marker flagging its temporal aspect
(3) come up with more examples, also review and reformulate the existing ones

HW: unassigned

Wednesday, 13 October 2021

Issue 543:

MD presented HW –examples for E54 and outgoing properties (P90, P91).

A vote was called on introducing them to the model and deleting the remaining fictitious ones.
In favor: 8
Against: none
Outcome: the new examples for E59, P90 and P91 will be introduced in CIDOC CRM. The fictitious examples were all removed.

DECISION: update the examples sets for E54, P90 and P91 as in the appendix.

Issue closed

Issue 559:

MD presented HW for issue 559: equivalence axiom for O12 has dimension and P43 for S10 Material Substantial and subclasses and update of the scope note.

Vote to accept the proposed changes:
In favor: 10
Against: none
Outcome: axiom to be inserted in the definition of O12 has dimension

DECISION: details in the appendix

- to add the axiom to the FOL section of O12 has dimension in CRMsci;
- to express the equivalence axioms in prose.

HW: MD to formulate the axiom in prose

Issue 531:

MD presented HW: an attempt at an outline of what counts as an instance for Observable Situation, and a number of categorical examples for SdS to use in his HW (formulation of the scope note of Observable Situation).

Comments:

- Not so clear whether Observable Situations only apply to things that have, in fact, been observed (any situation that has been observed, can in principle be observed). The observable parameters need not have already materialized in all instances of Observable Situations.
- Defining the parameters precedes actual observations, but we need to formulate constraints on how the observable entities will appear in the properties that Observable Situation can consist of.

Proposal: MD to continue working on the list of situations that are (or are not) eligible for observation. GH to contribute with examples from excavation records (where they have modelled stratigraphic units using S4 Observation). Begin with material things and then move to topological relations and dynamic (speed, events etc.) relations.

HW: MD and GH to work as proposed. TV to supply with examples from risk assessment.

Issue 525:

AK presented the graphs for the introduction to CRMsci.

- Slide for **S5 Inference Making** not to be included for the time being, there are open issues regarding it.
- Slide for **S19 Encounter Event**:
  - correct the typo S19 Encounter Event.O19 encountered object: ~~E18 Physical Thing~~ E20 Biological Object
  - instances of "Equipment Type" –make it E55 Type

Vote to update the slides accordingly and add them all (except for the one for S5 Inference Making) to the definition of CRMsci.
In favor: 6
Against: none
Decision: accepted

HW: AK to update the slides and add them to the definition of CRMsci.

New issue: descriptive text for CRMsci diagrams

Add explicatory text to the diagrams for CRMsci.

Decide on who provides the descriptive text for the diagrams, where they go in the CRMsci definition –i.e. update the introductory section as well.

HW: unassigned.

Issue 524:

MD presented HW –the reworked FOL statements and rendition in prose for **O21 encountered at** and **O19 encountered object**. Details below (in underscore):

O21 encountered at (witnessed encounter)

$O21(x,y) \Rightarrow S19(x)$
$O21(x,y) \Rightarrow E53(y)$
$O21(x,y) \Rightarrow (\exists z)[\ E53(z) \wedge P161(x,z) \wedge P89(y,z)]$
$O21(x,y) \Rightarrow (\exists z,v,w)[\ E93(w) \wedge E18(z) \wedge E52(v) \wedge O19(x,z) \wedge P195(w,z) \wedge P4(x,v) \wedge P164(w,v) \wedge P197(w,y)]$

In words:

There exists a place z which is the spatial projection P161 of the encounter event S19, and contains P89i the place of encounter.

The presence E93 of P195 the encountered object O19 at the time E52 of P4 the encounter P197 covered parts of (or P167 was within) the place of encounter.

A **vote** was called to update the FOL accordingly.
In favor: 6

Against: none
Outcome: accepted

O19 encountered object (object was encountered at)

$O19(x,y) \Rightarrow S19(x)$

$O19(x,y) \Rightarrow E18(y)$

$O19(x,y) \Rightarrow (\exists z)[E53(z) \wedge O21(x,z)]$

A **vote** was called to update the FOL accordingly.
In favor: 8
Against: none
Outcome: accepted

Decision: accept the FOL statements and the supplementary text for O21

Issue Closed

New Issue: FOL statements in prose –appropriate section of class/property definitions

Work out a well-formulated proposal for where the text rendering FOL statements should be put in the definitions of classes and properties. Probably at the end of the text, right before the examples.

HW: MD to provide a reading guide for the FOL and where it goes on scope notes. GH, TV, CEO to proofread.

Comments on how to read the FOL statements:

- maybe the labels of classes/properties should appear as well
- maybe we could draft graphs for the FOL statements.

Issue 532:

Point 1:

AF proposed to change the cardinality of AP13.2 justified (is justification of) back to one-to-many (0,n:0,1) on the grounds that one result (physical relation btw stratigraphic units) cannot have multiple causes of a given type.

Vote on changing the cardinality to one-to-many (0,n:0,1)
In favor: 7
Against: none
Outcome: accepted

Point 2:

Nowhere in the introduction of CIDOC CRM is there a mention of the cardinality of .1/.2 properties. If we don't want to add cardinalities to.1/.2 properties on a one-by-one basis, then we need to add some text settling the .1/.2 cardinalities in the introduction section. Otherwise, we should create a formula whereby to add the cardinality constraints for all properties that have them.

But it should be done in a separate issue.

Decision: in agreement, new issue –see below

Issue closed

New Issue: cardinality constraints for typed properties

Decide whether the cardinality constraints for typed properties will be determined once and for all in the introduction of the CIDOC CRM document or on a one-by-one basis (where they appear). If the latter, a concrete proposal should be made on where to declare the cardinality of each typed property.

HW: CEO, MD, TV to work on that

Belief adoption. Texts, (possible) reality models, beliefs
–presentation by Pavlos Fafalios

Link to presentation

Issue 510:
MD presented HW –enriched model for belief adoption, FOL and provenance statements and the scope notes for proposed classes and properties, see below:

Overview of the model
Belief Adoption Analytically
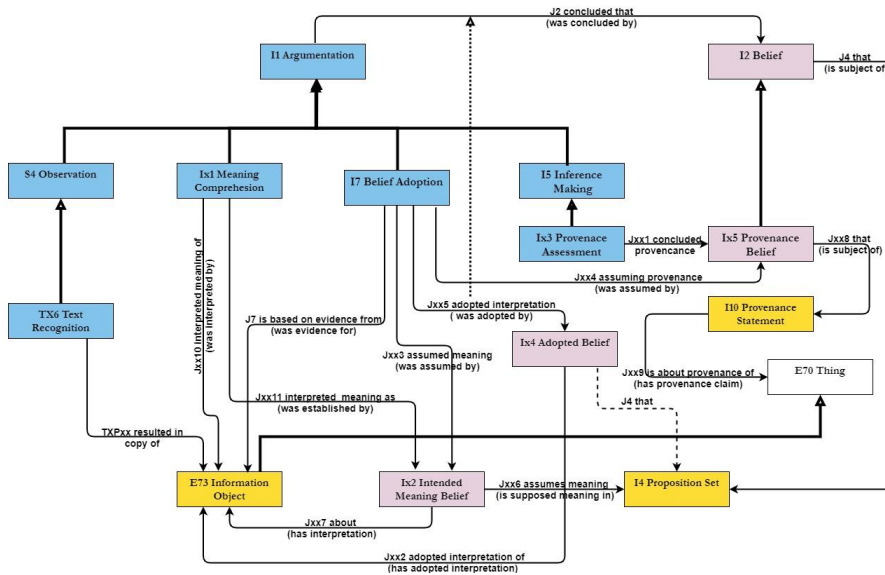
Belief Adoption Analytically, interpretation logic
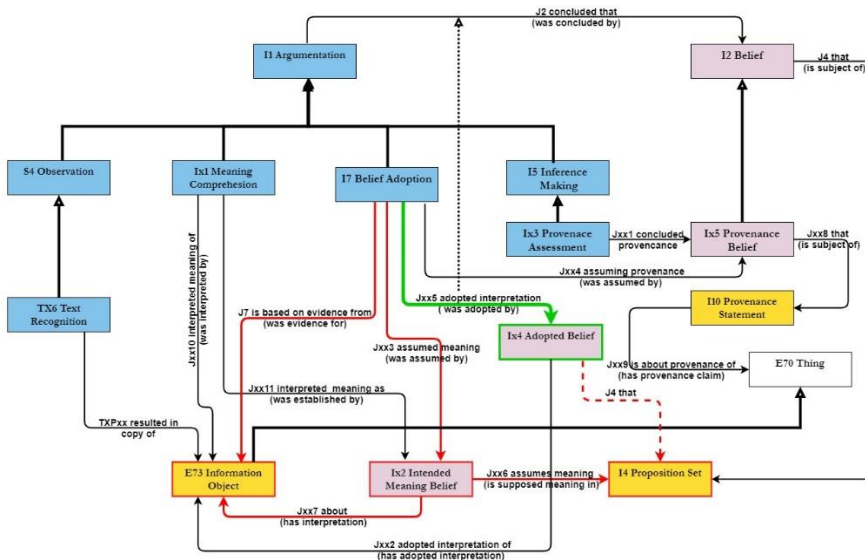
Belief Adoption Analytically, Provenance logic
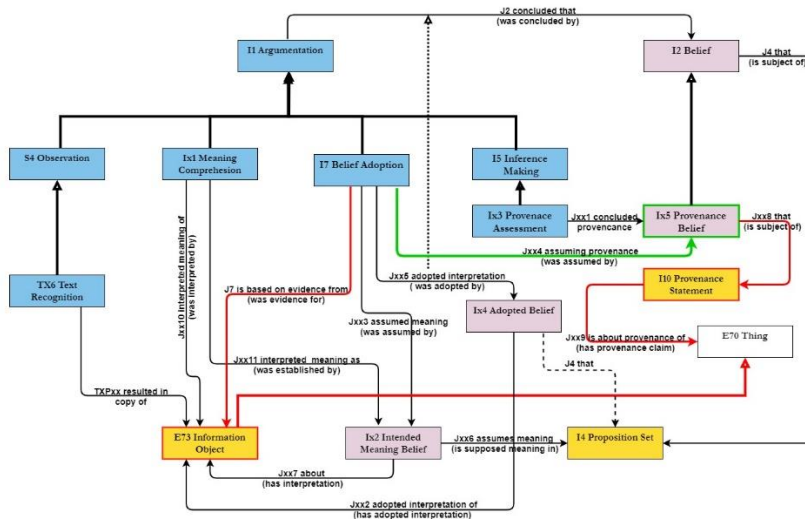
Discussion points:

- the texts (f.i. "Odessa school") go to the instance of I4 Proposition Set (bottom right hand side)
- the model represents a fully-fledged inferencing path, that in documentation systems will most often be shortcut over. Given a belief adoption and a citation, then we understand the intended meaning to be true.
- the revised scope notes should be accepted first, in order to implement this model

Proposed scope note revisions

MD walked the sig through the proposed scope note revisions (I7 Belief Adoption, Ix1 Meaning Comprehension, Ix2 Intended Meaning Belief). CRMtex should provide the instances of E73 Information Object derived from instances of S4 Observations.

No decision was reached on the grounds of SdS not being present for the discussion.

SIG members were asked to provide examples of named entities, the identity of which has either not been decided upon or provide citations that question existing interpretations thereof. Also review the scope notes and overall model.

HW: AF, VA, FB, MD, PF

Issues 549, 546, 545 –CRMtex issues

Decision: the scope notes of Tx5 Reading, Tx6 Transcription, Tx8 Grapheme and TxP11 transcribed (was transcribed by) to be redrafted in order to:

(1) clearly distinguish btw atomic units of writing vs combinations thereof, by means of introducing a concept of *Txx Grapheme Occurrence Sequence* and associate it with an instance of E73 Information Object (or a specialization)
(2) showcase the relation btw glyphs(/monographs…) and graphemes
(3) explain the correspondences btw transcriptions from one type of writing system to another and the parts of written text that get transcribed

HW: AF, FM, PR, MD. TV to proofread

Thursday, 14 October 2021

360 LRMoo

R56 is related to (is related to)

Vote to update as suggested below, namely:

- to rename to R56 has related form (is related form of): on the grounds that this way it follows the pattern used for P130 shows features of (features are also found on).
- to change the full path back to: E89 Propositional Object. P67 refers to: E1 CRM Entity. P67 refers to: E89 Propositional Object
- to change the examples to fit the new label (follow the first one as a prototype)

In favor: 9
Against: none
Outcome: Accepted

Decision: according to the proposal, for details, see appendix.

R36 uses script conversion (is script conversion used in)

Vote to update as suggested below, namely:

- to modify the scope note, in order to clarify the script gets converted between scripts, not the nomen itself.
- to add an FOL constraint, indicating that the string of one instance of F12 Nomen is modified to create the string of the other instance of F12 Nomen.

In favor: 8
Against: none
Outcome: accepted

Decision: as proposed, for details, see appendix
HW: MD to provide the FOL constraint

R35 is specified by (specifies)

Vote to update as suggested below, namely:

- change domain to F12 Nomen (F35 Nomen Use Statement having been deprecated)
- change range to F2 Expression (F34 Controlled Vocabulary intended to be deprecated in the near future)
- change superproperty to: P67i is referred to by
- edit the scope note to avoid mention to F35 and F34
- remove the .1 property
- addition of the "Insecta" example

In favor: 8
Against: none
Outcome: accepted

Decision: as proposed, for details, see appendix

HW: PR to provide an example (name of an author not from a controlled vocabulary)

R74 uses expression of (has expression used in)

Vote to update the property linking distinct works, one of which includes some expression of the other suggested below, namely:

- to accept scope note & examples,
- to assign IDNo
- to introduce FOL statement to express the constraint between the two instances of F1 Work

In favor: 8
Against: none
Outcome: accepted

Decision: as proposed, for details, see appendix

HW: MD to provide the FOL constraint btw the instances of F1 Work

R75 incorporates (is incorporated in)

Vote to update the property linking expressions of distinct works –one expression incorporating some expression of the other suggested below, namely:

- to accept scope note & examples,
- to assign IDNo
- to update R5 has component (is component of) –instead of referring to P165 incorporates (is incorporated in), it can now refer to R75 incorporates (is incorporated in).

In favor: 6
Against: none
Outcome: accepted

Decision: as proposed, for details, see appendix

HW: MD to provide the FOL constraint that the instances of F1 Work involved (some F2 Expression of one being included in the other) are distinct.

R8 combines (is combined to form)

Vote to update as suggested below, namely:

- to keep the range of R8 as F12 Nomen
- to update the scope note
- to update the full path that R8 stands as the shortcut of
- to delete the superproperty
- to rework the ISBN examples (make sure that only one meaningful substring is mentioned in each example & note that the "leftover" elements that are part of the construction rules need not have to be meaningful as nomens for the property to apply)
- rework all examples to make sure that only one instance of F12 Nomen appears in the range of the property

In favor: 6
Against: none
Outcome: accepted

Decision: as proposed, for details, see appendix

HW: PR to edit the ISBN examples following the template.

R69 specifies physical form (is specified physical form of)

Vote to update as suggested; relabel, assign it a superproperty, decide on the quantification, update the scope note, update the examples, and add a new example (e-book and appropriate reader)

In favor: 8
Against: none
Outcome: accepted

Decision: as proposed, for details, see appendix

HW: PR new example (e-book and appropriate reader).

R70 specifies dimension (is specified dimension of)

Vote to update as suggested, namely:

- relabel (to R70 has dimension(is dimension of)),
- add a superproperty statement (P43 has dimension),
- edit quantification (one-to-many, dependent (0,n:1,1)),
- update scope note,
- add examples
- **deprecate** *R72 specifies number of parts (is the specified number of parts for)* in favor of *R70 has dimension (is dimension of)*

In favor: 7
Against: none
Outcome: accepted

Decision: as proposed, for details, see appendix

R71 specifies material part (is specified material part for)

Vote to update as suggested, namely:

- relabel (to **R71 has part (is part of)**),
- add a superproperty statement (**P148 has component**),
- update scope note,

In favor: 8
Against: none
Outcome: accepted

Decision: as proposed, for details, see appendix

HW: Check the scope note of F3 and ensure it covers the concept of what a structural part that is itself an F3 can be, and to clarify that component expressions of manifestations do not necessarily form included manifestations themselves (i.e. if not separable, NOT A UNIT, not an intended publication).

Rnn has elaboration/ has specialization

Vote to not create Rnn has specialization:

In favor: 7
Against: none
Outcome: accepted

Decision: not to create Rnn has specialization after all. Defer reaching a decision re.

(i)   Deprecation of R10 is member of (has member)
(ii)   Making R67 has part (is part of) a direct subproperty of P148 has component (is component of)
(iii)   Deleting the paragraph in the scope note of R67 that refers to R10

to a later SIG meeting.

F2 Expression/ F28 Expression Creation
Vote to update both F2 and F28:

- delete the paragraph about oral tradition from F28 Expression Creation
- redraft and move the paragraph about oral tradition from the scope note of F28 Expression Creation to F2 Expression
- addition of "À Pierre" example from (deprecated) F25 Performance Plan to F2 Expression
- augment the "Inferno" example of F2 Expression

In favor: 8
Against: none
Outcome: accepted

Decision: as proposed, for details, see appendix

Discussion on quantification of R4 embodies (is embodied in)
Proposal: change the quantification of R4 from one to many, necessary (1,n:0,n) to (1,n:1,n)

Discussion: the quantification as is already declares the property to be one-to-many, necessary.

F56 Externalization Event
The LRMoo group will reconsider (a) deprecating F29 Recording Event and (b) drafting a property whereby to link F31 Performance and F28 Expression Creation that will be IsA P9 consists of.

Provide a concrete proposal to be discussed extensively in the next SIG meeting. The proposal should cover the superproperties of **R65 recorded aspects of (had aspects recorded through)** and **R20 recorded (was recorded through)** too.

HW: PR, TA, MZ, MD

New Issue: R34 has validity period
A new issue where to discuss where the property R34 has validity period belongs, outside of LRMoo. The point of the property is to link something to its validity period.

Friday, 15 October 2021
CIDOC CRM in the context of the German National Research Data Infrastructure (NFDI)
presentation by Robert Nasarek

Link to presentation

The CRM Game (new, digital version)
Presentation by Olivier Marlet (MASA), François-Xavier Tallgorn (INDYTION), Anaïs Guillem (UC Merced) and George Bruseker (Takin.solutions)

to presentation

Link to the CRM Game site: http://www.cidoc-crm-game.org/

Issue 518

Example: The settlement activity of the population of Lerna IV and Lerna V (E7)

["While Caskey notes a major cultural break between the EH II and EH III remains at Lerna, he argues for a high level of continuity in the following periods, until the site was transformed into a cemetery during LH I. The domestic architecture dating from EH III to LH I (Lerna IV-V, roughly from 2200-1500 B.C.) is therefore considered together as a physical expression of one cultural group, naturally acknowledging and critically examining significant changes over the course of this period. Caskey's reports are supplemented by the works of Jeremy Rutter and Carol Zerner, which are particularly important for the EH III and early MH remains respectively.]

(Elizabeth Courtney Banks, The Settlement and Architecture of Lerna IV. Lerna: results of excavations conducted by the American School of Classical Studies at Athens, 6. Princeton: American School of Classical Studies at Athens, 2013)

No responses to the e-vote called on July 4th 2021 for the examples re. the settlement of Lerna. SIG members were asked to either vote in favor or express their objections.
In favor: 8
Against: none
Outcome: accepted

Decision: The example will be made part of E7 Activity.

Issue 531

return to vote to accept the class-hierarchy and proposed definitions, which had not been voted in during the 50th SIG meeting.

Vote to update the definition of S4 Observation (keep the isA E13 Attribute Assignment):
PS: Substituting O9 and O16 with Oxx observed situation is not part of the vote.
In favor: 6
Against: none
Outcome: accepted

Decision: the definition of S4 Observation to be updated as proposed. Details in the appendix.
HW: AK to check and format the first example according to the template (The excavation of unit XI by the Archaeological Institute of Crete in 2004).

Vote to update the definition of S15 Observable Entity:
In favor: 7
Against: none
Outcome: accepted

Decision: the definition of S15 Observable Entity to be updated as proposed. Details in the appendix.

Close issue, once the 1st example of S4 Observation has been updated by AK

Issue 516

GB gave the citation information re. the examples for E10 Transfer of Custody retrieved from the Getty Provenance Index.

Proposed citation style below:

Getty Provenance Index®, https://piprod.getty.edu/starweb/pi/servlet.starweb?path=pi/pi.web, accessed YYYY-MM-DD

Apply citation form and close the issue.

Issue 496:

The SIG reviewed HW by MD, PR, TV (functional role of a minimal vocabulary document)

Propose to:

- implement editorial changes on the document –
  HW: SdS
- include document in the CIDOC CRM definition (as a good practice. Not following the guidelines **will not** result in incompatibility with the CRM)
- identify classes for which there exist type recommendations (carry on working on CEO's list) –**HW**: TV, MD
- start a new issue where to discuss the recommendations (grouped together)
- close issue 496

Vote on proposal:
In favor: 10
Against: none
Outcome: accepted

Decision: proceed as proposed. The current version of the type requirements statement can be found in the appendix.

Issue closed

New issue: collect recommended types

continues issue 496. The purpose is to identify classes for which there exist type recommendations (carry on working on CEO's list) –**HW**: TV, MD

Nb. Merge with issue 556

Semantic data and the representation of historical knowledge: the example of the LACRIMALIT Ontology

presentation by Maria Papadopoulou

Link to presentation

Issue 553

The SIG decided to not go through the discussion of this issue, given that DO (who had proposed it in the first place) was absent.

The title of the issue will change to Equality and Respect Statement, which seems more appropriate. The status of the issue has been left to "Proposed".

Issue 413:

PR proposed that even though F51 Pursuit and F52 Name Use Activity conceptually do not belong to LRMoo, they should nonetheless be kept there until a more suitable extension is found that can host them. People have been using them, and their deletion would cause problems for existing implementations, if there was no migration path for them. They will be marked as *deprecated in the near future*, along the lines of R34 has validity period.

The question is what model they will ultimately be moved to.

Expected next step: from the CRMsoc side to see if both classes fit and what changes they should undergo to be admitted there.

Do not discuss until a concrete proposal has been made. The issue for Everyone in agreement.

Include a reference to the appropriate CRMsoc issue (412). Nb: 412 has been resolved and closed in the 45th SIG meeting (October 2019).

Issue 487:

Proposal to leave P79 beginning is qualified by and P80 end is qualified by in CIDOC CRM and close the issue.

Vote on proposal
In favor: 7
Against: none
Outcome: accepted

Decision: P79 and P80 to be kept in CIDOC CRM.

Issue closed

Proposal to close issues that have not been discussed for more than two years.

Maybe we should reconsider this

Issue 351:

Points raised by EC involve:

- lack of clear purpose statement: state who it is intended for, why they should take it into consideration, how will it help implementers do a better job (i.e. exploit the CRM in its full potential)
- not adequate explanation in examples (i.e. why are they relevant, what do they contribute in the text)
- dense, academic prose vs normal prose used interchangeably. Not too clear what the former register contributes, in terms of readability or other purpose –such sections need be rewritten
- fonts and styles, citation styles not consistent, close reading necessary.
- possibly break the document into a series of documents.

For an extensive commenting and editing on the document, see here.

Discussion points:

People trained to create standards and people trained to write documentation that can be understood by non-experts are not one and the same group. Need funding to assign someone the task of redrafting this (and other) introductory documents/training material.

This has to be done in a sustainable fashion. Instead of asking people to redraft all documents, once we're done editing them, we could organize a series of workshops on how to write documentation. SdS has someone in mind (professional author, knows a thing or two about creative writing). This stands as a concrete funding proposal.

Regarding the points EC raised:

Adressing pt 1. (stating the purpose) will help resolve the other problems. If there is need to break the document into multiple ones (each addressing one well-defined issue) or if there is need to rewrite the document with multiple idealizations of end-users in mind etc., this will become apparent by fleshing out the purpose the

document serves.

<u>Alternative purposes suggested:</u>

- how the CRM came to life, what principles it followed –then it's not a guideline, but a history of CIDOC CRM
- identifying a set of best practices to be used when one is creating an ontology. It shouldn't be specifically about the CIDOC CRM.

Vote: on the proposals by EC –No.1 can be acted upon immediately
In favor: 8
Against: none
Outcome: proposal accepted. Start with 1st point, then move on to the others.

Decision: proceed as stated in proposal.
HW: MD, EC, OE, SdS to identify intended users of this text.

Next SIG Meetings for 2022

- February 8-11, 2022 in Crete (as announced in the 50th SIG Meeting)
- May 10-13, 2022 (either in Liege or Rome or Oslo, if the invites for Rome/Liege are no longer relevant)
- September 13-16, 2022 [place tbd]
- December 6-9, 2022 [place tbd]

HW: CEO to contact DF & MA (Rome) and MvR (Liege) to check if the invites are still valid.

Many SIG members [PR, CEO, GB, TV] objected that 4 in person meetings a year are difficult to implement. Maybe we could split meetings to in person and virtual/hybrid ones. The latter could be reserved for small issues/wordsmithing etc.

HW: concrete proposal by the editorial group on how to proceed with the in person and hybrid/virtual meetings

APPENDICES

I)   List of abbreviated names

AF	Achille Felicetti
AK	Athina Kritsotaki
CEO	Christian-Emil Ore
DF	Donatella Fiorani
DO	Dominic Oldman
EC	Erin Canning
ETz	Elias Tzortzakakis
FB	Francesco Beretta
FM	Francesca Murano
GB	George Bruseker
GH	Gerald Hiebel
MA	Marta Acierno
MD	Martin Doerr
MR	Mélanie Roche
MvR	Muriel van Ruymbeke
MZ	Maja Zumer
OE	Oyvind Eide
PF	Pavlos Fafalios
PM	Philippe Michon
PR	Pat Riva
RS	Robert Sanderson
SdS	Stephen Stead
TA	Trond Aalberg
TV	Thanasis Velios
VA	Vincent Alamercery

II)   Model Changes

560:
Points addressed

- Should the official RDF still contain 'P81 ongoing throughout' and 'P82 at some time within' pointing to literal or should these be substituted by P81a/b and P82a/b that point to literals? It can yield alternative treatments of time intervals.
  - ⇒ **Just keep P81 and P82 pointing to literal and also include P81a/b and P82a/b**
- Should this policy be also implemented for 'P170i time is defined by'? Elias wonders if the a/b split of the property should be implemented for P170i as well.
  - ⇒ **We only have P170i and do not include a/b properties**
- For the moment we have a separate module for PCs –should they be integrated in the official RDF?
  - ⇒ **There are separate modules for version 6.0 and 6.2.**
  - ⇒ **We need one for 7.1.1 (which includes a new property of property: P189 approximates / P189.1 has type)**
  - ⇒ **FORTH plans to open a new issue on this**
- E61 Time Primitive should it be xsd:dateTime in the official RDF?
  - ⇒ **Just keep literal and avoid restriction to specific datatypes**

- Datatypes of Primitives that are specified as either xsd datatypes or literals. However, a decision must be reached re. E94 Space Primitive and E95 Spacetime Primitive. He needs feedback from the SIG for that.
  - ⇒ **Just keep literal and avoid restriction to specific datatypes**

517:

additional explanation of [+/-] reflexivity in the introduction section (terminology)

The definition of **reflexivity** changed

FROM (old)

Reflexivity is defined in the standard way found in mathematics or logic: A property P is reflexive if the domain and range are the same class and for all instances of x of this class, the following is the case: x is related by P to itself. The intention of a property as described in the scope note will decide whether a property is reflexive or not. An example of a reflexive property is *E53 Place. P89 falls within (contains): E53 Place*

TO (new)

Reflexivity is defined in the standard way found in mathematics or logic: a property P is reflexive if the domain and range are the same class and for all instances x, of this class the following is the case: x is related by P to itself. The intention of a property as described in the scope note will decide whether a property is reflexive or not. An example of a reflexive property is *E53 Place. P89 falls within (contains): E53 Place*.

Since geometric areas can be arbitrarily close to each other, the distinction, if two places with imprecisely known extents are identical or are contained one in the other, can be difficult or unknown. Defining this property as reflexive allows for describing in one statement the topological constraint that a place x is either contained in a place y or identical to y. However, it is not meant to instantiate this property in a knowledge base for all instances of the domain class. In First Order Logic, we denote reflexivity by:

"Pnn(x,x)"

Non-reflexivity

The definition of Non-reflexivity is as follows:

Non-reflexivity is defined in the standard way found in mathematics or logic: A property P is non-reflexive if the domain and range are the same class but for all instances x, of this class the following is the case: x cannot be related by P to itself. The intention of a property as described in the scope note will decide whether a property is non-reflexive or not. An example of a non-reflexive property is E18 Physical Thing. P46 is composed of (forms part of): E18 Physical Thing. Since instances of E18 Physical Thing are required to be distinct, it is reasonable to use the property P46 is composed of only for associating an instances of E18 Physical Thing with a part being different from the whole. In logic, this is expressed by non-reflexivity. In First Order Logic, we denote non-reflexivity by:

" ¬Pnn(x,x)"

543:

Example sets:

E54 Dimension

- the weight of the Luxor Obelisk [250 metric tons]

- the vertical height of the statue of David by Michaelangelo [5.17 metres]

- the weight of the Great Star of Africa diamond [530.2 carats]

- the calibrated C14 date for the Shroud of Turin [AD1262-1312, 1303-1384]

- the horizontal diameter of the Stonehenge Sarsen Circle [33 metres] (Pryor, 2016)

- the length of the sides of the Great Pyramid at Giza [230.34 metres] (Lehner and Hawass, 2017)

- the duration of the time span of the Battle of Issos/Issus on 15th November 333 B.C.E. [less than 12 hours] (Howard, 2012)

- Christie's hammer price, in British Pounds, for Vincent van Gogh's "Still Life: Vase with Fifteen Sunflowers" in London on 30th March 1987 (E97) [24.75 million GBP (Brithish Pounds)]

- the result of the carbon 14 dating of the "Schoeninger Speer II" in 1996 [which *has type (P2)* carbon 14 dating (E55) and *has unit (P91)* BP (E55) and *has value (P90)* 400.000 . It was a dating of an approximately 400.000 year old complete Old Palaeolithic wooden spear found in Schoeningen, Niedersachsen, Germany, in 1995.] (Kouwenhoven, 1997)

P90 has value
- Christie's hammer price for Vincent van Gogh's "Still Life: Vase with Fifteen Sunflowers" in London on 30th March 1987 (E97) *has value* 24,750,000 (E60).
- The result of the carbon 14 dating of the "Schoeninger Speer II" in 1996 (E54) *has value* 400.000 (E60) [It was a dating of an approximately 400.000 year old complete Old Palaeolithic wooden spear found in Schoeningen, Niedersachsen, Germany, in 1995.] (Kouwenhoven, 1997)

P91 has unit
- Christie's hammer price for Vincent van Gogh's "Still Life: Vase with Fifteen Sunflowers" in London on 30th March 1987 (E97) *has unit* GBP (E55).
- The result of the carbon 14 dating of the "Schoeninger Speer II" in 1996 (E54) *has unit* BP (E55) ["BP" stands for "before present" and is used for calibrated C14 dating results. It was a dating of an approximately 400.000 year old complete Old Palaeolithic wooden spear found in Schoeningen, Niedersachsen, Germany, in 1995.] (Kouwenhoven, 1997)

559:

Examples

OLD
- The earthquake of Mexico city in 2017 *had dimension* magnitude 6.2 Richter (Mindock, 2017, http://www.independent.co.uk/news/world/americas/mexico-earthquake-todaylatest-mexico-city-magnitude-6-tremor-damage-a7963211.html)
- The landslide that was activated in Parnitha in 1999 after the earthquake, *had dimension* crest length > 70 (InGeoCloudS - INspiredGEOdata CLOUD Services D2.2 2012;D2.3 2013)

NEW
- The earthquake of Mexico city in 2017 **(E7)** *has dimension* magnitude 6.2 Richter (Mindock, 2017, http://www.independent.co.uk/news/world/americas/mexico-earthquake-today-latest-mexico-city-magnitude-6-tremor-damage-a7963211.html).
- The landslide that was activated in Parnitha in 1999 after the earthquake **(E26)**, *has dimension* crest length > 70 (InGeoCloudS - INspiredGEOdata CLOUD Services D2.2 2012; D2.3 2013)

FOL expression
The FOL expressions of the equivalence axiom reads:

$$[O12(x,y) \wedge S10(x)] \Rightarrow P43(x,y)$$

$$[P43(x,y) \wedge S10(x)] \Rightarrow O12(x,y)$$

360

R56 is related to (is related to)
The definition changed

R56 is related to (is related to)

Domain:	F12 Nomen
Range	F12 Nomen
Subproperty of:	(none)
Shortcut of:	E89 Propositional Object (1) *P1i identifies*: E1 CRM Entity *P1 is identified by:* E89 Propositional Object (2)
Quantification:	(0,n:0,n)

Scope note:

This property associates an instance of F12 Nomen with another instance of F12 Nomen which co-refers to the same instance of E1 CRM Entity. In addition, the nomens may be related in some context, such as replacing former use, etc.. This property is transitive.

The property R56.1 allows for specifying the particular kind of relationship that holds between the content (the associated instances of E62 String) of the domain nomen and the range nomen, such as by being a derivation, an alternative, a lexical variant, etc. Typing the association may introduce a meaning of the inverse direction which may cause loss of transitivity.

Examples:

'Čajkovskij, Petr Il′ič' (F12) *is related to* 'Пётр Ильич Чайковский' (F12), with *has type* transliteration (E55).

'The Lord of the Rings' (F12) *is related to* 'Le Seigneur des anneaux' (F12), with *has type* original language (E55).

'IFLA' (F12) *is related to* 'International Federation of Library Associations and Institutions'' (F12), with *has type* acronym.

'Siam' (F12) *is related to* 'Thailand' (F12).

'595.7' (F12) *is related to* 'Insecta' (F12). [The latter being the caption for the Dewey Decimal Classification number in the English language 23rd edition.]

Properties: R56.1 has type: E55 Type

R56 has related form (is related form of)

Domain:	F12 Nomen
Range:	F12 Nomen
Subproperty of:	(none)
Shortcut of:	E89 Propositional Object (1). P67 refers to: E1 CRM Entity. P67 refers*:* E89 Propositional Object (2)
Quantification:	(0,n:0,n)

Scope note:

This property associates an instance of F12 Nomen with another instance of F12 Nomen which co-refers to the same instance of E1 CRM Entity. This property is transitive.

The property R56.1 allows for specifying the particular kind of relationship that holds between the domain nomen and the range nomen, such as by being a derivation, an alternative, a lexical variant, etc. Typing the association may cause loss of transitivity.

Examples:

'Čajkovskij, Petr Il′ič' as the name of the Russian composer (F12) has related form 'Пётр Ильич Чайковский' as the name of the Russian composer (F12), with *has type* transliteration (E55).

[the rest of the examples are to be updated accordingly]

Properties: R56.1 has type: E55 Type

The definition changed

FROM (old)

R36 uses script conversion (is script conversion used in)

Domain:	[F12](#) Nomen
Range:	[F36](#) Script Conversion
Is shortcut of:	[F12](#) Nomen. *R17i was created by (created):* [E65](#) Creation. *P33 used specific technique (was used by)*: [E29](#) Design or Procedure
Quantification:	(0,1:0,n)
Scope note:	This property associates an instance of F12 Nomen with the instance of F36 Script Conversion that was used to create the instance of F12 Nomen. The source of this conversion may or may not be explicitly mentioned.
Examples:	‘Du Fu’ as the name for a Chinese poet of the 8th century (F12) *uses script conversion* Pinyin (F36).
	‘Čajkovskij, Petr Il′ič’ as the name of the Russian composer (F12) *uses script conversion* ‘ISO 9 Information and documentation — Transliteration of Cyrillic characters into Latin characters — Slavic and non-Slavic languages’ (F36).

TO (new)

R36 uses script conversion (is script conversion used in)

Domain:	[F12](#) Nomen
Range:	[F36](#) Script Conversion
Is shortcut of:	[F12](#) Nomen. *R17i was created by (created):* [E65](#) Creation. *P33 used specific technique (was used by)*: [E29](#) Design or Procedure
Quantification:	(0,1:0,n)
Scope note:	This property associates an instance of F12 Nomen with the instance of F36 Script Conversion that was used to create the E62 String used in that instance of F12 Nomen from the string used in another instance of F12 Nomen that co-refers with the first nomen (the instances of F12 Nomen are related via the R56 has related form property). The source of this conversion may or may not be explicitly mentioned.
Examples:	‘Du Fu’ as the name for a Chinese poet of the 8th century (F12) *uses script conversion* Pinyin (F36).
	‘Čajkovskij, Petr Il′ič’ as the name of the Russian composer (F12) *uses script conversion* ‘ISO 9 Information and documentation — Transliteration of Cyrillic characters into Latin characters — Slavic and non-Slavic languages’ (F36).

The definition of the property changed

FROM (old)

R35 is specified by (specifies)

Domain:	F35 Nomen Use Statement
Range:	F34 Controlled Vocabulary
Subproperty of:	E89 Propositional Object. P148 has component (is component of): E89 Propositional Object

Quantification:	(1,1:1,n)
Scope note:	This property associates an instance of F35 Nomen Use Statement with an instance of F34 Controlled Vocabulary in which the Nomen Use Statement has a given status. The property R35.1 allows for specifying the particular status of the nomen use statement within the controlled vocabulary. An instance of *R35 is specified by* should have only one status.
Examples:	'acoustic surface wave device' (F35) *R35 is specified by* INSPEC Thesaurus version January 1973 (F34) *R35.1 has status* valid (E55)
	'acoustic surface wave device' (F35) *R35 is specified by* INSPEC Thesaurus version June 1978 (F34) *R35.1 has status* obsolete (E55)
Properties:	R35.1 has status: E55 Type

TO (new)

R35 is specified by (specifies)

Domain:	F12 Nomen
Range:	F2Expression
Subproperty of:	E1 CRM Entity. P67i is referred to by: E89 Propositional Object.
Quantification:	(1,1:1,n)
Scope note:	This property associates an instance of F12 Nomen with an instance of F2 Expression which documents, defines or provides evidence for the particular nomen in the stated sense.
Examples:	'acoustic surface wave device' (F35) *R35 is specified by* INSPEC Thesaurus version January 1973 (F34) *R35.1 has status* valid (E55)
	'595.7' as a classification number for the taxonomic class Insecta (insects) (F12) *is specified by* the 23rd edition of the Dewey Decimal Classification (DDC) (F2).

R74 uses expression of (has expression used in)

R74 uses expression of (has expression used in)

Domain:	F1 Work
Range:	F1 Work
Subproperty of:	E70 Thing. P130 shows features of (features are also found on): E70 Thing
Quantification:	(0,n:0,n)
Scope note:	This property associates an instance of F1 Work with another instance of F1 Work where all expressions of the former will include some expression of the latter. This property is transitive. This property represents the generalized relationship between works that is described at the expression level using *R75 incorporates (is incorporated in)*.
Examples:	The musical work by Ludwig van Beethoven entitled 'Symphony No. 9' (F1) *uses expression of* the poem 'An die Freude' by Friedrich Schiller (F1).
	Franz Schubert's kunstlied 'Erlkönig' (F1) *uses expression of* the poem 'Erlkönig' by Johann Wolfgang von Goethe (F1).
	The symphonic poem 'Vltava' by Bedřich Smetana (F1) *uses expression of* the melody 'La Mantovana' attributed to Giuseppe Cenci (F1).

R75 incorporates (is incorporated in)

Domain:	F2 Expression
Range:	F2 Expression
Subproperty of:	E73 Information Object. P165 incorporates (is incorporated in): E90 Symbolic Object
Quantification:	(0,n:0,n)
Scope note:	This property associates an instance of F2 Expression with an instance of F2 Expression that is an integral part of the first, but where the existence of the latter realises a different instance of F1 Work is independent of from the first. This property is transitive.
Examples:	The 1964 recording of Beethoven's 9th Symphony by Leonard Bernstein and the New York Philharmonic (F2) incorporates the German text of the poem 'An die Freude' by Friedrich Schiller (F2).
	Franz Schubert's score for the kunstlied 'Erlkönig' that was created in 1815 (F2) incorporates the German text of the poem 'Erlkönig' by Johann Wolfgang von Goethe (F2).
	Pyotr Ilyich Tchaikovsky's graduation cantata performed by Leslie Head and the Kensington Symphony Orchestra in 1978 (F2) incorporates a Russian translation of the poem 'An die Freude' by Friedrich Schiller (F2).

R5 has component (is component of)

R5 has component (is component of)

Domain:	F2 Expression
Range:	F2 Expression
Subproperty of:	E89 Propositional Object. P148 has component (is component of): E89 Propositional Object
Quantification:	(0,n:0,n)
Scope note:	This property associates an instance of an F2 Expression X with a structural component Y that conveys a part of the overall work realized by X, such as volumes, chapters, paragraphs. This property is transitive.
	Any part of an expression that conveys complete propositions, such as a single phrase, can be documented using the more general property P148 has component (is component of).
	Any part of an expression that does not completely follow meaningful boundaries, such as lines or pages of text or portions visible on images, can be documented using the property P106 is composed of (forms part of), and not with R5 has component (is component of). Fragments, in particular, can be documented with the more specific property R15 has fragment (is fragment of).
	This property does not cover the relationship that exists between expressions that are realisations of different works, where one is re-used in a new, larger expression. Such a relationship is modelled by P165 R75 incorporates (is incorporated in).
Examples:	The Italian text of Dante's textual work entitled 'Divina Commedia' (F2) has component the Italian text of Dante's textual work entitled 'Inferno' (F2).
	The musical notation of Mozart's Singspiel entitled 'Die Zauberflöte' (F2) has component the musical notation of Mozart's aria entitled 'Der Hölle Rache', also known as 'The Queen of the Night's Aria' (F2).
	The visual content of the map entitled 'Wales – The Midlands – South West England', scale 1:400,000, issued by Michelin in 2005 (F2) has component the visual content of the inset entitled 'Liverpool', scale 1:200,000, set within the compass of the map titled 'Wales – The Midlands – South West England', scale 1:400,000, issued by Michelin in 2005 (F2).

The definition of the property changed

FROM (old)

R8 combines (is combined to form)

Domain:	F12 Nomen
Range:	E90 Symbolic Object
Subproperty of:	E90 Symbolic Object. P106 is composed of (forms part of): E90 Symbolic Object
Quantification:	(0,n:0,n)
Scope note:	This property associates an instance of F12 Nomen with one of the non-syntactic instances of E90 Symbolic Object which are combined to form it.
Examples:	The English term 'starfish' (F12) [an instance of F12 Nomen that refers to echinoderms] combines the English term 'star' (F12) [an instance of F12 Nomen that refers to celestial bodies], and combines the English term 'fish' (F12) [an instance of F12 Nomen that refers, in its looser sense, to animals that live exclusively in water].
	The controlled access point 'The Adoration of the Shepherds (Coventry)' (F12) combines 'The Adoration of the Shepherds' (F12) [a title, i.e., an instance of F12 Nomen that refers to a work], and combines 'Coventry' (F12) [an instance of F12 Nomen that refers to a place].
	The controlled access point 'Guillaume, de Machaut, ca. 1300-1377' (F12) combines 'Guillaume' (E90) [a given name], and combines 'Machaut' (F12) [an instance of F12 Nomen that refers to a place], and combines 'ca. 1300-1377' (F12) [an instance of F12 Nomen that refers to a time-span].
	The controlled access point 'Univerza v Ljubljani. Oddelek za bibliotekarstvo' (F12) combines 'Univerza v Ljubljani' (F12) [an instance of F12 Nomen that refers to a corporate body], and combines 'Oddelek za bibliotekarstvo' (F12) [an instance of F12 Nomen that refers to another corporate body, affiliated to the former].
	ISBN-10 '978-002-002-0' (F12) combines '978' (E90) [an instance of E90 Symbolic Object indicating the Nigerian ISBN Agency], combines '002' (E90) [an instance of E90 Symbolic Object indicating the Nigerian Institute of International Affairs], combines '002' (E90) [an instance of E90 Symbolic Object used for the publication entitled 'Nigeria's international economic relations'], and combines '0' (E90) [an instance of E90 Symbolic Object that constitutes the control character for this ISBN].

TO (new)

R8 combines (is combined to form)

Domain:	F12 Nomen
Range:	F12 Nomen
Shortcut of:	F12 Nomen (1). R33 has content: E62 String (1). P190i has symbolic content (is symbolic content of): E90 Symbolic Object (1): P106 is composed of: E90 Symbolic Object (2). P190 has symbolic content: E62 String (2). R33i has content (is content of): F12 Nomen (2)
Quantification:	(0,n:0,n)
Scope note:	This property associates an instance of F12 Nomen with one of the non-syntactic instances of F12 Nomen whose associated E62 string is combine to form it.

The examples need to be reworked to only include one instance in the range of the proprerty per example

Examples:	The English term 'starfish' (F12) [as an instance of F12 Nomen that refers to echinoderms] *combines* the English term 'star' (F12) [as an instance of F12 Nomen that refers to celestial bodies], and *combines* the

English term 'fish' (F12) [as an instance of F12 Nomen that refers, in its looser sense, to animals that live exclusively in water].

'The Adoration of the Shepherds (Coventry)' as a controlled access point for the work (F12) *combines* 'The Adoration of the Shepherds' (F12) [a title, i.e., as an instance of F12 Nomen that refers to a work], and *combines* 'Coventry' (F12) [as an instance of F12 Nomen that refers to a place].

'Guillaume, de Machaut, ca. 1300-1377' as a controlled access point for a person (F12) *combines* 'Guillaume' (E90) [as a given name], and *combines* 'Machaut' (F12) [as an instance of F12 Nomen that refers to a place], and *combines* 'ca. 1300-1377' (F12) [as an instance of F12 Nomen that refers to a time-span].

'Univerza v Ljubljani. Oddelek za bibliotekarstvo' as a controlled access point for a corporate body (F12) *combines* 'Univerza v Ljubljani' (F12) [as an instance of F12 Nomen that refers to a corporate body], and *combines* 'Oddelek za bibliotekarstvo' (F12) [as an instance of F12 Nomen that refers to another corporate body, affiliated to the former].

ISBN-10 '978-002-002-0' as an identifier for the publication entitled 'Nigeria's international economic relations' (F12) *combines* '978' (F12) [as an instance of F12 Nomen indicating the Nigerian ISBN Agency], *combines* '002' (F12) [as an instance of F12 Nomen indicating the Nigerian Institute of International Affairs], *combines* '002' (F12) [as an instance of F12 Nomen used for the publication entitled 'Nigeria's international economic relations']

'History -- France -- 14th century' as a controlled subject term for the concept (F12) *combines* 'History' (F12) [as a term for the concept], *combines* 'France' (F12) [as an instance of F12 Nomen that refers to the country], and *combines* '14th century' (F12) [as an instance of F12 Nomen that refers to a time-span]. [These elements combined according to the order and syntax prescribed in the Library of Congress Subject Headings (LCSH) subject headings language.]

'595.7096' as a classification number for insects in Africa in the 23rd edition of the Dewey Decimal Classification (F12) *combines* '595.7' as the classification number for insects (the taxonomic class Insecta), and *combines* '096' as the notation corresponding to the continent Africa. [Classification number built according to the structural rules of the Dewey Decimal Classification.]

R69 specifies physical form (is specified physical form of)
The definition changed

FROM (old)
R69 specifies physical form (is specified physical form of)

Domain: F3 Manifestation

Range: E55 Type

Subproperty of: F3 Manifestation. R??: E55 Type

Quantification: (0,n:0,n)

Scope note: This property associates an instance of F3 Manifestation with an instance of E55 Type describing the kind of physical form that characterizes examples carrying this F3 Manifestation. In the case that the F3 Manifestation is intended to be used and distributed in digital form, the property describes the form of the physical carrier on which it can be obtained, e.g.: CD, USB, online file, etc.

In the case that the F3 Manifestation is an abstraction of a singleton item, the property describes the actual physical form the F3 Manifestation was abstracted from. This inference is an induction along the path that can be modelled as: F3 Manifestation. *R7i is materialized in:* F5 Item. *P2 has type*: E55 Type.

It can happen that a given exemplar, or subset of exemplars, originally produced, or intended to be produced, with the specific characteristic, accidentally lacks it. This fact should be recorded as a property of F5 Item, and not of F3 Manifestation.

Examples:	The sound recording entitled 'The Glory (????) of the human voice', identified by label and label number 'RCA Victor Gold Seal GD61175', containing recordings of musical works performed by Florence Foster Jenkins (F3) *specifies physical form* Compact Disc (E55).

R69 has physical form (is specified physical form of)

Domain:	F3 Manifestation
Range:	E55 Type
Subproperty of:	E1 CRM Entity. P2 has type: E55 Type
Quantification:	(1,n:0,n)
Scope note:	This property associates an instance of F3 Manifestation with an instance of E55 Type describing the kind of physical form that characterizes instances of F5 Item carrying this F3 Manifestation.
	In the case of instances of manifestations intended to be rendered by mediation (such as with electronic devices), the form also indicated the kind of equipment and software tools necessary..
Examples:	The publication entitled 'A clockwork orange' by Anthony Burgess, published by Penguin Books Ltd in 2008, identified by ISBN '0141037229' (F3) has physical form Printed book (E55).
	The sound recording entitled 'The Glory (????) of the human voice', identified by label and label number 'RCA Victor Gold Seal GD61175', containing recordings of musical works performed by Florence Foster Jenkins (F3) has physical form Compact Disc (E55).
	The photograph of Billie Holiday by Carl Van Vechten dated 23 March 1949, owned by the Library of Congress and identified by call number LOT 12735, no. 524 [P&P] (F3) has physical form Gelatin silver print (E55).
	The Long Play record entitled 'Help!' by The Beatles, released by Parlophone, 6 August 1965, with catalogue number PMC1255 (F3) has physical form Vinyl Long Play record (E55)

R70 specifies dimension (is specified dimension of)

The definition changed

R70 specifies dimension (is specified dimension of)

Domain:	F3 Manifestation
Range:	E54 Dimension
Subproperty of:	F3 Manifestation. R??: E54 Dimension
Quantification:	(1,n:1,1)
Scope note:	This property associates an instance of F3 Manifestation with an instance of E54 Dimension that describes aspects of its symbolic content, such as word counts, or describes the kind of physical form that characterizes examples carrying this F3 Manifestation, such as number of pages. In the case that the F3 Manifestation is an abstraction of a singleton item, the property describes the dimensions of the actual physical form the F3 Manifestation was abstracted from.
	This inference is an induction along the path that can be modelled as: F3 Manifestation. *R7i is materialized in:* F5 Item. *P43 has dimension:* E54 Dimension.

It can happen that a given exemplar, or subset of exemplars, originally produced, or intended to be produced, with the specific characteristic, accidentally lacks it. This fact should be recorded as a property of F5 Item, and not of F3 Manifestation.

Examples:	The publication entitled 'Functional Requirements for Bibliographic Records: final report', published by K. G. Saur in 1998, identified by ISBN '3-598-11382-X' (F3) *R70 specifies dimension* height (E54): *P90 has value* '24' (E60) and *P91 has unit* 'cm' (E58)
	The jigsaw puzzle entitled 'Map of the New York city subway system', designed by Stephen J. Voorhies and released around 1954 by the Union Dimes Savings Bank (F3) *R70 specifies dimension* length and height (E54) *P3 has note* '46 x 29 cm' (E62)

TO (new)
R70 has dimension (is dimension of)

Domain:	F3 Manifestation
Range:	E54 Dimension
Subproperty of:	E70 Thing. P43 has dimension: E54 Dimension
Quantification:	(1,n:1,1)
Scope note:	This property associates an instance of F3 Manifestation with an instance of E54 Dimension that describes aspects of its symbolic content, such as word counts, or describes the kind of physical form that characterizes instances of F5 Item carrying this F3 Manifestation, such as number of pages.
	This inference is an induction along the path that can be modelled as: F3 Manifestation. R7i is materialized in: F5 Item. P43 has dimension: E54 Dimension.
	It can happen that a given item, or subset of items, originally produced, or intended to be produced with a certain value for a particular kind of dimension, has a different value for this kind of dimension by accident. This fact should be recorded as a property of F5 Item, and not of F3 Manifestation.
Examples:	The publication (printed book) entitled 'Functional Requirements for Bibliographic Records: final report', published by K. G. Saur in 1998, identified by ISBN '3-598-11382-X' (F3) *has dimension* height (E54) which *has value (P90)* 24 (E60) and *has unit (P91)* cm (E58).
	The publication (printed book) entitled 'A clockwork orange' by Anthony Burgess, published by Penguin Books Ltd in 2008, identified by ISBN '0141037229' (F3) *has dimension* number of pages (E54) which *has value (P90)* 176 (E60).
	The publication (blu-ray box set) entitled 'Marvel Agents of S.H.I.E.L.D. the Complete Fourth Season' produced by abc Studios, released in 2018 and identified by EAN *'8717418521622'* (F3) *has dimension* number of discs (E54) which *has value (P90)* 6 (E60).
	The jigsaw puzzle entitled 'Map of the New York city subway system', designed by Stephen J. Voorhies and released around 1954 by the Union Dimes Savings Bank (F3) *has dimension* length and height (E54) which *has note (P3)* '46 x 29 cm' (E62).
	The jigsaw puzzle entitled 'Map of the New York city subway system', designed by Stephen J. Voorhies and released around 1954 by the Union Dimes Savings Bank (F3) *has dimension* number of pieces (E54) which *has value (P90)* 76 (E60).

R72 specifies number of parts (is the specified number of parts for)
R72 specifies number of parts (is the specified number of parts for) is deprecated

R70 specifies material part (is specified material part for)
The definition changed

R71 specifies material part (is specified material part for)

Domain:	F3 Manifestation
Range:	F3 Manifestation
Subproperty of:	F3 Manifestation. R??: F3 Manifestation
Quantification:	(0,n:0,n)
Scope note:	This property links an instance of F3 Manifestation which prescribes that all its physical exemplars will contain, as a separable part, an exemplar of the associated instance of F3 Manifestation. This property is transitive

R71 has part (is part for)

Domain:	F3 Manifestation
Range:	F3 Manifestation
Subproperty of:	E89 Propositional Object. P148 has component (is component of): E89 Propositional Object
Quantification:	(0,n:0,n)
Scope note:	This property associates an instance of F3 Manifestation with a structural part of it that is itself an instance of F3 Manifestation. This property is transitive.

Examples:	The publication (printed book) containing J.R.R. Tolkien's 'The Lord of the rings' identified by ISBN '0618260587' (F3) *has part* the publication containing J.R.R. Tolkien's 'The two towers' identified by ISBN '0618260595' (F3).
	The compact disc publication issued by Deutsche Grammophon in 1998 and consisting of a recording of Richard Wagner's 'Der fliegende Holländer' as performed in 1991 by Plácido Domingo, Cheryl Studer et al., and conducted by Giuseppe Sinopoli (F3) *has part* a publication consisting of the printed programme notes and libretto (F3).
	The compact disc publication issued as a 2-CD set identified as 'M2K 42270' by CBS Records in 1987 and consisting of recordings of J. S. Bach's concertos for keyboard/clavier and strings performed by Glenn Gould (F3) *has part* the compact disc publication identified as 'DIDC 10370' consisting of the Glenn Gould recordings of Bach's Concertos nos. 1-4 (F3).

F28 Expression Creation/ F2 Expression

F28 Expression Creation

The definition of F28 Expression Creation changed

FROM (old)

F28 Expression Creation

Subclass of:	E12 Production
	E65 Creation
	F56 Externalization Event
Superclass of:	Recording Event
	F30 Manifestation Creation

Scope note:	This class comprises activities that result in instances of F2 Expression coming into existence. This class characterises the externalisation of an F1 Work. The creation of an instance of F1 Work is considered to occur at the time of creation (F28) of its first F2 Expression.
	Although F2 Expression is an abstract entity, a conceptual object, the creation of an expression inevitably also affects the physical world: when you scribble the first draft of a poem on a sheet of paper, you produce an instance of F3 Manifestation. F28 Expression Creation is a subclass of E12 Production because the recording of the expression causes a physical modification of the E18 Physical Thing that serves as the carrier. The work becomes manifest by being expressed on a physical carrier other than the creator's brain. The spatio-temporal circumstances under which the expression is created are necessarily the same spatio-temporal circumstances under which the first instance of F3 Manifestation is produced.
	The mechanisms through which *oral tradition* (of myths, tales, music, etc.) operates are not further investigated in this model. As far as bibliographic practice is concerned, only those instances of F2 Expression that are externalised on physical carriers other than both the creator's brain and the auditor's brain are taken into account (for a discussion of the modelling of oral traditions, see: Nicolas, Yann. 'Folklore Requirements for Bibliographic Records: oral traditions and FRBR.' In: *Cataloging & Classification Quarterly* (2005). Vol. 39, No. 3-4. P. 179-195).
	It is possible to use the *P2 has type (is type of)* property in order to specify that the creation of a given expression of a given work played a particular role with regard to the overall bibliographic history of that work (e.g., that it was the creation of the progenitor expression on which all other expressions of the same work are based; or that it was the creation of the critical edition that served as the basis for canonical references to the work).
	An instance of F28 Expression Creation may use as source material a specific existing instance of F2 Expression. The property P16 *used specific object (was used for)* can be used to specify the source expression for the derivation. In cases such as a translation or a revised edition, etc., a new instance of F2 Expression of the same F1 Work, a derived expression, is created. 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 is indicated using the property *R2 is derivative of (has derivative)* between the two instances of F1 Work. Path: F1 Work(1). *R3 is realised in:* F2 Expression(1). *P16i was used for:* F28 Expression Creation. *R17 created*: F2 Expression(2). *R3i realises*: F1 Work(2). *R2 is derivative of*: F1 Work(1)
Examples:	the creation of the original manuscript score of 'Uwertura tragiczna' by Andrzej Panufnik in 1942 in Warsaw
	the reconstruction from memory of the manuscript score of 'Uwertura tragiczna' by Andrzej Panufnik in 1945 after the original score was destroyed during the war
	the creation, by Lord Byron, of the English text of his work entitled 'Manfred' (*P2 has type:* E55 Type {major original contribution})
	the creation, by Woldemar Starke, of his German translation of Lord Byron's text entitled 'Manfred' (*P2 has type:* E55 Type {translation})
	the recording of the third alternate take of 'Blue Hawaii' performed by Elvis Presley in Hollywood, Calif., Radio Recorders, on March 22nd, 1961 (F29) [each individual take is a distinct instance of F2 Expression]
Properties:	R17 created (was created by): F2 Expression
	R18 created (was created by): F5 Item
	R19 created a realisation of (was realised through): F1 Work

TO (New)
F28 Expression Creation

Subclass of:	E12 Production
	E65 Creation
	F56 Externalization Event

Superclass of:	Recording Event
	F30 Manifestation Creation
Scope note:	This class comprises activities that result in instances of F2 Expression coming into existence. This class characterises the externalisation of an F1 Work. The creation of an instance of F1 Work is considered to occur at the time of creation (F28) of its first F2 Expression.
	Although F2 Expression is an abstract entity, a conceptual object, the creation of an expression inevitably also affects the physical world: when you scribble the first draft of a poem on a sheet of paper, you produce an instance of F3 Manifestation. F28 Expression Creation is a subclass of E12 Production because the recording of the expression causes a physical modification of the E18 Physical Thing that serves as the carrier. The work becomes manifest by being expressed on a physical carrier other than the creator's brain. The spatio-temporal circumstances under which the expression is created are necessarily the same spatio-temporal circumstances under which the first instance of F3 Manifestation is produced.
	It is possible to use the *P2 has type (is type of)* property in order to specify that the creation of a given expression of a given work played a particular role with regard to the overall bibliographic history of that work (e.g., that it was the creation of the progenitor expression on which all other expressions of the same work are based; or that it was the creation of the critical edition that served as the basis for canonical references to the work).
	An instance of F28 Expression Creation may use as source material a specific existing instance of F2 Expression. The property P16 *used specific object (was used for)* can be used to specify the source expression for the derivation. In cases such as a translation or a revised edition, etc., a new instance of F2 Expression of the same F1 Work, a derived expression, is created. 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 is indicated using the property *R2 is derivative of (has derivative)* between the two instances of F1 Work. Path: F1 Work(1). *R3 is realised in:* F2 Expression(1). *P16i was used for:* F28 Expression Creation. *R17 created*: F2 Expression(2). *R3i realises*: F1 Work(2). *R2 is derivative of*: F1 Work(1)
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	the reconstruction from memory of the manuscript score of 'Uwertura tragiczna' by Andrzej Panufnik in 1945 after the original score was destroyed during the war
	the creation, by Lord Byron, of the English text of his work entitled 'Manfred' (*P2 has type:* E55 Type {major original contribution})
	the creation, by Woldemar Starke, of his German translation of Lord Byron's text entitled 'Manfred' (*P2 has type:* E55 Type {translation})
	the recording of the third alternate take of 'Blue Hawaii' performed by Elvis Presley in Hollywood, Calif., Radio Recorders, on March 22nd, 1961 (F29) [each individual take is a distinct instance of F2 Expression]
Properties**:**	R17 created (was created by): F2 Expression
	R18 created (was created by): F5 Item
	R19 created a realisation of (was realised through): F1 Work

F2 Expression

The definition of F2 Expression changed

FROM (old)

F2 Expression

Subclass of:	E73 Information Object

Superclass of: F3 Manifestation

F34 Controlled Vocabulary

Scope note: This class comprises the intellectual or artistic realisations of Works in the form of identifiable immaterial objects, such as texts, poems, jokes, musical or choreographic notations, movement pattern, sound pattern, images, multimedia objects, or any combination of such forms that have objectively recognisable structures. The substance of F2 Expression is signs.

An Expression is the outcome of the intellectual or creative process of realizing a Work. Subsequent expressions conveying the same work may be created over time.

Expressions do not depend on a specific physical carrier and can exist on one or more carriers simultaneously, including human memory, but expressions cannot persist without a carrier.

The form of F2 Expression is an inherent characteristic of the F2 Expression. Differences in form implies different Expressions (e.g., from text to spoken word, a transcript of a recording). Similarly, differences in language or means of performance imply different Expressions (e.g., translations or arrangements for different instruments). Thus, if a text is revised or modified, the result is considered to be a new F2 Expression. While theoretically any change in signs will result in a new Expression, conventionally the context and use will determine the rules for distinguishing among expressions.

Examples:

the Italian text of Dante's 'Divina Commedia' as found in the authoritative critical edition 'La Commedia secondo l'antica vulgata a cura di Giorgio Petrocchi', Milano: Mondadori, 1966-67 (= 'Le Opere di Dante Alighieri', Edizione Nazionale a cura della Società Dantesca Italiana, VII, 1-4) (F2, E33) [multiple instantiation]

the Italian text of Dante's 'Inferno' as found in the same edition (F2, E33) [multiple instantiation]

the signs which make up Christian Morgenstern's 'Fisches Nachtgesang' [a poem consisting simply of '—' and '˘' signs, arranged in a specific combination]

the set of instructions for the production of a Yiddish translation of the textual work entitled 'King Lear', as directed by Sergei Radlov in Moscow in 1935 (F2, E29, E33) [multiple instantiation]

the set of instructions for the production of the ballet entitled 'Rite of spring', as choreographed by Pina Bausch in Wuppertal in 1975 (F2, E29, E33) [multiple instantiation]

the set of instructions by Bruno Walter for performing Gustav Mahler's 9th symphony, delivered by him to the Columbia Symphony Orchestra during rehearsals in Hollywood in 1961 (as partially documented in the CD entitled 'Bruno Walter conducts and talks about Mahler symphony No. 9: rehearsal & performance') (F2, E29) [multiple instantiation]

the set of instructions contained in the "performance handbook" for Luigi Nono's musical work entitled 'À Pierre' (F2, E29, E33) [multiple instantiation]

Properties: R5 has component (is component of): F2 Expression

R15 has fragment (is fragment of): E90 Symbolic Object

R75 incorporates (is incorporated in): F2 Expression

TO (new)
F2 Expression

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Subclass of: E73 Information Object

Superclass of: F3 Manifestation

F34 Controlled Vocabulary

Scope note: This class comprises the intellectual or artistic realisations of Works in the form of identifiable immaterial objects, such as texts, poems, jokes, musical or choreographic notations, movement pattern, sound pattern, images, multimedia objects, or any combination of such forms that have objectively recognisable structures. The substance of F2 Expression is signs.

An Expression is the outcome of the intellectual or creative process of realizing a Work. Subsequent expressions conveying the same work may be created over time.

Expressions do not depend on a specific physical carrier and can exist on one or more carriers simultaneously. As far as bibliographic practice is concerned, only instances of F2 Expression that are externalised on physical carriers other than both the creator's brain and the auditor's brain are taken into account.

The form of F2 Expression is an inherent characteristic of the F2 Expression. Differences in form implies different Expressions (e.g., from text to spoken word, a transcript of a recording). Similarly, differences in language or means of performance imply different Expressions (e.g., translations or arrangements for different instruments). Thus, if a text is revised or modified, the result is considered to be a new F2 Expression. While theoretically any change in signs will result in a new Expression, conventionally the context and use will determine the rules for distinguishing among expressions.

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the Italian text of Dante's 'Divina Commedia' as found in the authoritative critical edition 'La Commedia secondo l'antica vulgata a cura di Giorgio Petrocchi', Milano: Mondadori, 1966-67 (= 'Le Opere di Dante Alighieri', Edizione Nazionale a cura della Società Dantesca Italiana, VII, 1-4) (F2, E33) [multiple instantiation]

the Italian text of Dante's 'Inferno' as found in the same edition authoritative critical edition 'La Commedia secondo l'antica vulgata a cura di Giorgio Petrocchi', Milano: Mondadori, 1966-67 (= 'Le Opere di Dante Alighieri', Edizione Nazionale a cura della Società Dantesca Italiana, VII, 1-4) (F2, E33) [multiple instantiation]

the original English text of Lord Byron's work entitled 'Manfred' (F2, E33) [multiple instantiation]

the German text translated by Woldemar Starke, of Lord Byron's text entitled 'Manfred' (F2, E33) [multiple instantiation]

the signs which make up Christian Morgenstern's 'Fisches Nachtgesang' [a poem consisting simply of '—' and '˘' signs, arranged in a specific combination]

the set of instructions contained in the "performance handbook" for Luigi Nono's musical work entitled 'À Pierre' (F2, E29, E33) [multiple instantiation]

Properties: R5 has component (is component of): F2 Expression

R15 has fragment (is fragment of): E90 Symbolic Object

R75 incorporates (is incorporated in): F2 Expression

Issue 531

S4 Observation

The definition changed

S4 Observation

Subclass of:	E13 Attribute Assignment
Superclass of:	S21 Measurement
	S19 Encounter Event
Scope note:	This class comprises the activity of gaining scientific knowledge about particular states of physical reality through empirical evidence, experiments and measurements.

We define observation in the sense of natural sciences, as a kind of human activity: at some place and within some time-span, certain physical things and their behavior and interactions are observed by human sensory impression, and often enhanced by tools and measurement devices.

The output of the internal processes of measurement devices that do not require additional human interaction are in general regarded as part of the observation and not as additional inference. Manual recordings may serve as additional evidence. Measurements and witnessing of events are special cases of observations. Observations result in a belief about certain propositions. In this model, the degree of confidence in the observed properties is regarded to be "true" by default, but could be described differently by adding a property *P3 has note* to an instance of S4 Observation, or by reification of the property *O16 observed value*.

Primary data from measurement devices are regarded in this model to be results of observation and can be interpreted as propositions believed to be true within the (known) tolerances and degree of reliability of the device.

Observations represent the transition between reality and propositions in the form of instances of a formal ontology, and can be subject to data evaluation from this point on. For instance, detecting an archaeological site on satellite images is not regarded as an instance of S4 Observation, but as an instance of S6 Data Evaluation. Rather, only the production of the images is regarded as an instance of S4 Observation.

Examples:

The excavation of unit XI by the Archaeological Institute of Crete in 2004.The observation (S4) of the density (S9) of the X-Ray image of cupid's head from the painting "Cupid complaining to Venus" (S15) as "high density" (E1), on the 19th of March 1963 (Cranach Digital Archive, http://lucascranach.org/UK_NGL_6344).

The observation (S4) of visible light absorption (S9) of the painting "Cupid complaining to Venus" (S15) as "having red pigment", in 2015 (Foister, S., 2015).

In First Order Logic:

$S4(x) \supset E13(x)$

Properties:

O8 observed (was observed by): S15 Observable Entity

O9 observed property type (property type was observed by): S9 Property Type

O16 observed value (value was observed by): E1 CRM Entity

O? observed: Situation?

S4 Observation

Subclass of: E13 Attribute Assignment

Superclass of: S21 Measurement

                                 S19 Encounter Event

Scope note: This class comprises the activity of gaining scientific knowledge about particular states of physical reality through empirical evidence, experiments and measurements.

We define observation in the sense of natural sciences, as a kind of human activity: at some place and within some time-span, certain physical things and their behavior and interactions are observed by human sensory impression, and often enhanced by tools and measurement devices.

Observed situations or dimensions may pertain to properties confined to a single instance of S15 Observable Entity or pertain to constellations of multiple instances and relations between them, in particular distances between them.

The output of the internal processes of measurement devices that do not require additional human interaction are in general regarded as part of the observation and not as additional inference. Primary data from measurement devices are regarded in this model to be results of observation and can be interpreted as propositions believed to be true within the (known) tolerances and degree of reliability of the device.

Measurements and witnessing of events are special cases of observations. Observations result in a belief that certain propositions held at a time within the time-span of the observation. In this model, the degree of confidence in the observed properties is regarded to be "true" by default, but could be described differently by adding a property P3 has note to an instance of S4 Observation.

Examples:

The excavation of unit XI by the Archaeological Institute of Crete in 2004.

The observation (S4) of the density (S9) of the X-Ray image of cupid's head from the painting "Cupid complaining to Venus" (S15) as "high density" (E1), on the 19th of March 1963 (Cranach Digital Archive, http://lucascranach.org/UK_NGL_6344).

The observation (S4) of visible light absorption (S9) of the painting "Cupid complaining to Venus" (S15) as "having red pigment", in 2015 (Foister, S., 2015).

In First Order Logic:

$S4(x) \supset E13(x)$

Properties:

O8 observed (was observed by): S15 Observable Entity

O9 observed property type (property type was observed by): S9 Property Type

O16 observed value (value was observed by): E1 CRM Entity

O? observed: Situation?

The definition changed

FROM (old)

S15 Observable Entity

Subclass of: E1 CRM Entity

Superclass of: E2 Temporal Entity

                     E77 Persistent Item

Scope note:

This class comprises instances of E2 Temporal Entity or E77 Persistent Item, i.e. items or phenomena, such as physical things, their behavior, states and interactions or events, that can be observed by human sensory impression, often enhanced by using tools and measurement devices.

Conceptual objects manifestthrough their carriers such as books, digital media, or even human memory. Attributes of conceptual objects, such as number of words, can be observed on their carriers. If the respective properties between carriers differ, either they carry different instances of conceptual objects or the difference can be attributed to accidental deficiencies in one of the carriers. In that sense even immaterial objects are observable. By this model we address the fact that frequently, the actually observed carriers of conceptual objects are not explicitly identified in documentation, i.e., they are assumed to have existed but they are unknown as individuals.

Examples:

The domestic goose from Guangdong/1/1996 (H5N1) (S15) that was identified in 1996 in farmed geese in southern China as circulating highly pathogenic H5N1 (Wan, 2012).

The crow flight he observed over the waters of Minamkeak Lake during the summer of 2015

The eruption of Krakatoa volcano at Indonesia in 1883 (F.A.R., Archibald and Whipple, 1888).

The density of the cupid head area in the X-Ray of the painting "Cupid complaining to Venus" (http://lucascranach.org/UK_NGL_6344).

In First Order Logic:

$S15(x) \supset E1(x)$

Properties:

O12 has dimension (is dimension of): E54 Dimension

TO (new)

S15 Observable Entity

Subclass of: E1 CRM Entity

Superclass of: E5 Event

                     O10 Material Substantial

Scope note:

This class comprises instances of E5 Event or O10 Material Substantial (i.e. items or phenomena, such as physical things, their behavior, states and interactions or events), that can be observed by measurement or detection devices or by human sensory impression including when enhanced by tools.

In order to be observable, instances of E5 Event must consist of some interaction or action of material substance. In some cases, the spatiotemporal confinement of the event itself, such as a flash, a car stopping etc. marks the limits of a documented observation of an event. In other cases, such as the situation of a car passing by a certain object, the spatiotemporal limits of the event of observing itself, as well as the direction of attention or the orientation of used instruments, may constrain the observed detail of a larger process, e.g., noticing the sight of a car passing by; a light emission, etc.

Conceptual objects manifest through their carriers such as books, digital media, or even human memory. Attributes of conceptual objects, such as number of words, can be observed on their carriers. If the respective properties between carriers differ, either they carry different instances of conceptual objects or the difference can be attributed to accidental deficiencies in one of the carriers. In that sense even immaterial objects are observable. By this model we address the fact that frequently, the actually observed carriers of conceptual objects are not explicitly identified in documentation, i.e., they are assumed to have existed but they are unknown as individuals.

Examples:

The domestic goose from Guangdong/1/1996 (H5N1) (S15) that was identified in 1996 in farmed geese in southern China as circulating highly pathogenic H5N1 (Wan, 2012).

The crow flight he observed over the waters of Minamkeak Lake during the summer of 2015

The eruption of Krakatoa volcano at Indonesia in 1883 (F.A.R., Archibald and Whipple, 1888).

The density of the cupid head area in the X-Ray of the painting "Cupid complaining to Venus" (http://lucascranach.org/UK_NGL_6344).

In First Order Logic:

$$S15(x) \supset E1(x)$$

Properties:

O12 has dimension (is dimension of): E54 Dimension

Issue 496

The Functional role of a Minimal Vocabulary

The policy of the CIDOC CRM is to restrict classes to those that appear as specific domains or ranges of CIDOC CRM properties, because those properties structure the knowledge base and frequently appear hard-coded in the control-software, i.e., data entry, storage and access tools. Therefore they are of much higher priority for system interoperability than the classes without properties, which we model as instances of E55 Type, i.e. as data, as usual in conceptual modelling of databases since their conception.

Nevertheless, in certain cases the CIDOC CRM makes important and non-obvious ontological distinctions of specialization of CRM classes without assigning specific properties to them. These may differentiate and specialize even substance and identity criteria in a way that has a bearing on the use of properties, as in the case of E10 Transfer of Custody: The kind of transfer of custody, i.e., either field collection, transfer from one keeper to another or loss, can be specified by E55 Type, and consequently the property associating the donor or the receiver will not be used.

These distinctions normally appear in the scope notes with a hint about the need for respective vocabularies. They further appear in examples. Finally, a series of classes have been deprecated because they did not need specific properties, but backwards compatibility would require that they be turned into clearly recommended instances of E55 Type.

Over the past 30 years attempts to harmonize and integrate vocabularies in the cultural heritage (CH) domain have widely failed. Rather, some vocabularies play a more important role, but specialized needs are too abundant to allow for a systematic integration, and volatile vocabularies are an important tool of research in all sciences and humanities.

Therefore, the CRM-SIG will recommend in a document separate from the CIDOC CRM definition only those terms that are regarded to be important for the above mentioned ontological distinctions, and unambiguous enough to be fixed as standard. These may be linked or integrated as broader or narrower terms into vocabularies of the user's choice, in a way compatible with the meaning of the classes of the CRM where they will be used together.

The CRM-SIG may exemplify this on the base of the Art & Architecture Thesaurus (AAT) or the Backbone Thesaurus (BBT).

Further, CRM-SIG will recommend the use of some standard vocabularies for cases in which a good and comprehensive international practice exists, such as measurement units, country codes etc.