Towards CRM OWL

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Current state: CRM RDFs - ECRM OWL

**CRM RDFs:** maintained by Forth-ICS based on just the model specification document

**ECRM OWL:** maintained by Erlangen, Gnm, Koenig based on the model specification document with additional owl specific statements (restrictions, property classifications etc.)

These encodings are compatible but they follow different documentation decisions

- The differences and the Proposal initiative were presented by Mark Fichtner in [55th CIDOC CRM and 48th FRBR CRM](https://www.cidoc-crm.org/), December 2022. [Presentation link](https://www.cidoc-crm.org/sites/default/files/cidoc2022.pdf)

**Proposal:**

A) Create and maintain an additional **CRM OWL** implementation based on just the model specification - no additional owl specific statements

B) Follow the same documentation decisions for both **ECRM OWL** and **CRM OWL** rather than just adapting **CRM RDFs** to OWL syntax (owl:Class, owl:Ontology, owl:ObjectProperty, owl:DatatypeProperty)
A) CRM OWL creation

Main CRM OWL module can be created starting from CRM RDFs with some simple replacements

- Replace rdfs:Class with owl:Class
- Replace rdf:Property with range different from rdfs:Literal with owl:ObjectProperty
- Replace rdf:Property with range equal to rdfs:Literal with owl:DatatypeProperty

Main CRM OWL module will not include owl specific statements that are not explicitly specified in the model specification e.g. owl:Restrictions, owl:TransitiveProperty, owl:AsymmetricProperty etc.

- Further owl:ObjectProperty classifications proposals can automatically be created based on phrases detected in the scope note text of each property but we suggest that they will become part of a separate OWL module e.g. https://cidoc-crm.org/owl/7.1.3/CIDOC_CRM_v7.1.3_PropertyClassificationProposals.owl

Proposal A:

- Create main CRM OWL module without any additional statements compared to CRM RDFs.
- Next slides include suggestions to follow good practices from ECRM OWL
- Keep automatic detection of further property classifications in a separate module
- carefully go through the (automatically extracted) property classifications (transitive/symmetric/etc.) and make a final decision
B1: Scope note

- **CRM RDFs** includes just the model specification scope note
- **ECRM OWL** has a more elaborated scope note including Examples and FOL-Paragraphs etc.

Proposal B1:

- For **CRM OWL** we suggest that we should follow the **ECRM OWL** scope note specification format
- Do the same in the RDFS implementation???
B1: Scope note

crmrdfs:P1_is_identified_by scope note

crmrdfs:P1_is_identified_by scope note

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crmrdfs:P1_is_identified_by scope note

<rdf:comment xml:lang="en">This property describes the naming or identification of any real-world item by a name or any other identifier.

This property is intended for identifiers in general use, which form part of the world the model intends to describe, and not merely for internal database identifiers which are specific to a technical system, unless these latter also have a more general use outside the technical context. This property includes in particular identification by mathematical expressions such as coordinate systems used for the identification of instances of E53 Place. The property does not reveal anything about when, where and by whom this identifier was used. A more detailed representation can be made using the fully developed (i.e., indirect) path through E15 Identifier Assignment.

This property is a shortcut for the path from E1 CRM Entity through P140i was attributed by, E15 Identifier Assignment, P37 assigned to E42 Identifier.

It is also a shortcut for the path from E1 CRM Entity through P1 is identified by, E41 Appellation, P139 has alternative form to E41 Appellation.

</rdf:comment>
B2: Scope note of inverse properties

In the official model specification the declarations of properties are typically defined based on the forward direction each property.

a) Inverse properties where forward direction **IS** expressed in RDFs/OWL (e.g. P1i identifies)
   - **CRM RDFs**: does **NOT** define a scope note for these properties
   - **ECRM OWL**: defines scope note using the fields of the forward direction and specific notation that the text refers to the forward direction of the property

b) Inverse properties where the forward direction is **NOT** expressed in RDFs/OWL (e.g. P170i time is defined by)
   - **CRM RDFs**: defines scope note using the scope note of the forward direction and specific notation that the text refers to the forward direction of the property
   - **ECRM OWL**: defines scope note using the fields of the forward direction and specific notation that the text refers to the forward direction of the property

Proposal B2:

- For **CRM OWL** follow the **ECRM OWL** scope note of inverse properties format for both a) and b) cases
- Do the same in the RDFS implementation???
B2: Scope note of inverse properties

Scope note of crmrdfs: P170i_time_is_defined_by

The quantification allows several instances of E61 Time Primitive that are each expressed in different syntactic forms, to define the same instance of E52 Time-Span.

Scope note of ecrmowl:P170i_time_is_defined_by

Examples of the inverse property:
- “1800/1/1 0:00:00 - 1899/12/31 23:59:59” (E61) defines time the 19th century (E52).
- “1968/1/1 - 2018/1/1” (E61) defines time 1968/1/1 - 2018/1/1 (E52).
[an arbitrary time-span during which the Saint Titus reliquary was present in the Saint Titus Church in Heraklion, Crete]

In First Order Logic of the inverse property:
- P170(x,y) ⇒ E61(x)
- P170(x,y) ⇒ E52(y)
- P170(x, y) ⇒ P811(x, y) ∧ P821(x, y)
B3: Class/Property identifier

- **CRM RDFs** does not include any field that explicitly specifies the Class/Property identifier (E1, P1, P1i)
- **ECRM OWL** uses skos:notation in order to explicitly specify the Class/Property identifier (E1, P1, P1i)

\[ <\text{skos:notation}>P1i</\text{skos:notation}> \]

Proposal B3:

- For **CRM OWL** follow the **ECRM OWL** Class/Property identifier documentation decision
- Do the same in the RDFS implementation???
B4: rdfs:label

- **CRM RDFs** does not include the Class/Property identifier in rdfs:label
- **ECRM OWL** always includes the Class/Property identifier in rdfs:label
  - Both directions of properties include the identifier of the forward direction
    - e.g. P140 was attributed by instead of P140i was attributed by
  - ECRM OWL has been updated in order to:
    - Include rdfs:label with all translations specified in CRM RDFs prefixed by the identifier
    - Include skos:prefLabel for all translations specified in CRM RDFs in order to provide a property without the identifier

Proposal B4:

- For **ECRM OWL** we suggest that we should follow the ECRM OWL rdfs:label updated format and use the inverse property identifier for inverse property labels
- Do the same in the RDFS implementation???
B4: rdfs:label

CRM RDFs view in Protégé

ECRM OWL view in Protégé

CRM OWL view in Protégé
Links: CRM RDFs / CRM OWL / ECRM OWL

CRM RDFs:

- [https://cidoc-crm.org/rdfs/7.1.3/CIDOC_CRM_v7.1.3.rdf](https://cidoc-crm.org/rdfs/7.1.3/CIDOC_CRM_v7.1.3.rdf)
- [https://cidoc-crm.org/rdfs/7.1.3/CIDOC_CRM_v7.1.3_PC.rdf](https://cidoc-crm.org/rdfs/7.1.3/CIDOC_CRM_v7.1.3_PC.rdf)
- [https://cidoc-crm.org/rdfs/7.1.3/CIDOC_CRM_v7.1.3_Supplement.rdf](https://cidoc-crm.org/rdfs/7.1.3/CIDOC_CRM_v7.1.3_Supplement.rdf)

CRM OWL:

- [https://cidoc-crm.org/owl/7.1.3/CIDOC_CRM_v7.1.3.owl](https://cidoc-crm.org/owl/7.1.3/CIDOC_CRM_v7.1.3.owl)
- [https://cidoc-crm.org/owl/7.1.3/CIDOC_CRM_v7.1.3_PropertyClassificationProposals.owl](https://cidoc-crm.org/owl/7.1.3/CIDOC_CRM_v7.1.3_PropertyClassificationProposals.owl)

ECRM OWL:

- [https://erlangen-crm.org/ontology/ecrm/ecrm_current.owl](https://erlangen-crm.org/ontology/ecrm/ecrm_current.owl)
- [https://erlangen-crm.org/ontology/ecrm/ecrm_231027.owl](https://erlangen-crm.org/ontology/ecrm/ecrm_231027.owl) (remove once the next link becomes active)
- [https://erlangen-crm.org/ontology/ecrm/ecrm_240307.owl](https://erlangen-crm.org/ontology/ecrm/ecrm_240307.owl) (temporarily inactive)