Dublin Core and CIDOC CRM Harmonization

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1. Introduction

In order to integrate information from heterogeneous sources, ontologies as semantic technologies are a recommend solution. "An ontology is a description (like a formal specification of a program) of the concepts and relationships that can formally exist for an agent or a community of agents". (Gruber, 2001) CIDOC Conceptual Reference Model (CIDOC CRM) is a very prominent ontology used for such purposes.

The CIDOC CRM is intended to promote a shared understanding of cultural heritage information by providing a common and extensible semantic framework that any cultural heritage information can be mapped to. […] In this way, it can provide the "semantic glue" needed to mediate between different sources of cultural heritage information, such as that published by museums, libraries and archives. (CIDOC CRM)

As semantics mapping can be a solution for information integration and Dublin Core is the most prominent metadata used to describe web resources, we propose a harmonization between Dublin Core and CIDOC CRM ontology. According to Nilsson (2010, p. 107) harmonized standards is "*a set of metadata standards that can be semantically embedded into another standard*". Here, CIDOC CRM is used as the mediated schema to integrate metadata sources in the Cultural Heritage domain. It's important to mention that other works are making efforts in this direction, for example, the *Mapping of the Dublin Core Metadata Element Set to the CIDOC CRM* headed by Doerr (2000).

2. Mapping Dublin Core into CIDOC CRM ontology

Beneath we present a semantic mapping from the Dublin Core Metadata Element Set (DCMES) into CIDOC Conceptual Reference Model entities in other to provide information integration.

TABLE 1: DCMES and CIDOC CRM Harmonization.

Dublin Core	CIDOC CRM		Dublin Core	CIDOC CRM
Contributor	E39 Actor E74 Group E41 Appellation E10 Transfer of Custody E66 Formation		Type	E55 Type E17 Type Assignment
Coverage	E50 Date E52 Time-Span E53 Place E47 Spatial Coordinates E45 Address E48 Place Name		Publisher	E12 Production E29 Design or Procedure E51 Contact Point
Creator	E39 Actor E40 Legal Body		Identifier	E42 Object Identifier E15 Identifier Assignment

	E66 Formation E74 Group E41 Appellation		E73 Information Object E71 Man-Made Stuff E70 Stuff
Language	E56 Language	Type	E55 Type E17 Type Assignment
Description	E5 Event E7 Activity E12 Production E14 Condition Assessment E3 Condition State E18 Physical Stuff E19 Physical Object E20 Biological Object E22 Man-Made Object E23 Iconographic Object E24 Physical Man-Made Stuff E25 Man-Made Feature E26 Physical Feature E28 Conceptual Object	Date	E2 Temporal Entity E4 Period E50 Date
		Rights	E40 Legal Body E30 Right E72 Legal Object
		Source	E42 Object Identifier E62 String E73 Information Object
		Format	E16 Measurement E29 Design or Procedure E54 Dimension E57 Material E58 Measurement Unit
		Subject	E73 Information Object E46 Section Definition
		Relation	E27 Site E31 Document

3. Final considerations

According to the literature, there are many XML metadata mapping to the CIDOC CRM ontology efforts, since this ontology is considered one of the most appropriate models in integration architecture. On the other hand, Dublin Core is the most used metadata in semantic web applications. In this way, metadata can be mapped into an ontology to provide interoperability of its data and to achieve information integration. When the different kind of metadata are mapped into an ontology the system can interoperate and the information access is higher as well as their information retrieval.

The major difficulty found in this research was that the Dublin Core Element Set has just 15 attributes, on the other hand, CIDOC CRM has 93 entities, making it difficult to express all CRM relationships, so in this work, we chose only those entities that have their concepts more similar to the DCMES.

As DCMES is the most prominent metadata used to describe web resources, a DCMES and CIDOC CRM cross-walking model will be developed in a future work in order to handle cultural heritage data representation into the web.

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