CIDOC
Conceptual Reference Model

Information Groups

Produced by the ICOM/CIDOC
Documentation Standards Group

Editors: Nick Crofts, Ifigenia Dionissiadou, Martin Doerr, Pat Reed.

September 1998

Version 2
March 2001

Contents

Introduction

The CIDOC Conceptual Reference Model (CRM) is a formal ontology for the documentation of cultural heritage. It has been developed by the ICOM/CIDOC documentation standards group (DSG) over a period of several years. The complete model is quite complex and not easily presented in graphic format. The current document aims to provide an accessible introduction based on the CIDOC International Guidelines for Museum Object Information : The CIDOC Information Categories (CIC). The CRM is presented as a series of sub models each of which maps directly onto one of the 'information groups' defined by the CIC. In each case brief scope notes are included which explain the thinking behind the reference model and which make explicit the position of individual information items. Naturally, we recommend reading the current document in conjunction with the CIC.

The scope of the presentation of the model is deliberately restricted in a number of respects.

1. The model adopts the **conceptual frame** of its intended users (scholars, museum professionals and museum visitors, etc.). It does not aim to represent all possible points of view.
2. The model is focused on common **museum activities** (collections management and conservation, research and analysis, promotion and communication). Organisation-specific management procedures are not incorporated into the model, although possible implementation schemes are suggested which maintain compatibility with the reference model.
3. The model concentrates on aspects of cultural documentation incorporated in the **CIC**.
4. The model deals primarily with **objects** collected by museums
5. The model aims to provide a level of **detail** and **precision** required to provide an adequate quality of service. More detailed modelling is certainly possible, but probably not useful.
6. The need to avoid unnecessary **technical complexity** has also influenced the model.

It is not possible in the context of this document to provide an exhaustive exposition of the CRM. Please refer to the reference documentation for more details. A complete set of reference documents is available at the DSWG Web site:

http://cidoc.ics.forth.gr/

It is important to bear in mind that the CIDOC reference model is ongoing work. The present document represents the current state of the model resulting from a working meeting which took place in March 1998 in Crete. Although the broad outlines are now well established, some questions of detail still need to be dealt with. Your comments and suggestions are welcome.

Nick Crofts
Pat Reed
CIDOC Documentation Standards Group
September 1998

Introduction to version 2, March 2001.

Since the creation of this document, the CIDOC Conceptual Reference Model has undergone certain refinements. Version 2.1 of the CRM has been accepted by ISO TC46 SC4 as Committee Draft for a new work item. Therefore we have brought this document in a consistent state with version 2.1, which can be found on the DSWG Web site. Most changes have been about the naming of properties, following the strict naming principles applied in that version of the CRM.

Structural changes were few, mainly the raising of several properties from "Physical Object" to "Physical Entity". Doing the latter, we encountered an inconsistency in the version 2.1 : The property " Condition Assessment. concerns (assessed by)" points to "Physical Object", whereas its short cut "Physical Entity. has condition (condition of): Condition State" originates in "Physical Entity". Therefore, in contrast to version 2.1:

Condition Information
1) The property
     E14 Condition Assessment. concerns (assessed by): Physical Object
has been redirected to
     E14 Condition Assessment. concerns (assessed by): Physical Entity.

The same holds for Measurement Information:
2) The property
     E16 Measurement. measured (was measured): Physical Object
has been redirected to:
   E16 Measurement. measured (was measured): Physical Entity.

Martin Doerr
CIDOC CRM Special Interest Group
March 2001

Symbols used in the model

The symbols used in this document are derived from the French analysis and design methodology Merise.

Classes are represented as rectangles. The name of the class is at the top of the class and the attributes are listed beneath it, separated by a horizontal line. Internal attributes are not represented in the model, but left to implementation.

Person
has id
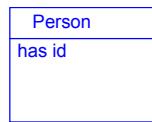
Relations, or links, are represented by ovals and lines drawn between classes. The name of the representation is at the top of the oval and the attributes are listed beneath it, separated by a horizontal line. We have adopted a *bidirectional* naming convention : reading from left to right the main label is used. A second name, in brackets, is used when reading from right to left.

is member of (has members)
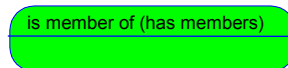
Cardinalities are represented as pairs of numbers, written on links between entities. Common values are o,n (none or many), 1,n (at least one), 1,1 (exactly one).

Person
has id

0,n   is member of (has members)   0,n

Legal Body
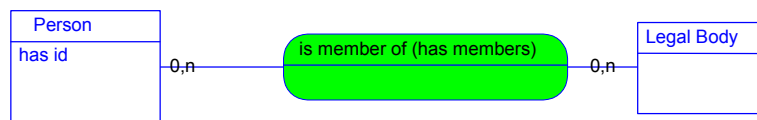
Inheritance (Isa) relations between classes are represented by lines drawn between classes and a half circle. A cross in the half circle indicates that the inheritance is exclusive.

Actor

Person
has id

0,n   is member of (has members)   0,n

Legal Body
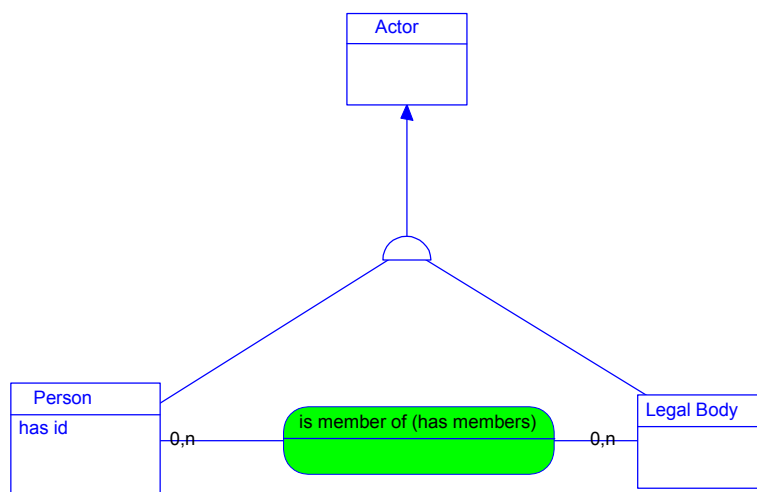
We have adopted three further conventions to simplify the presentation of the diagrams.

1. The full Isa hierarchy is sometimes truncated or omitted altogether. We have used dotted lines for the inheritance links in such cases.

2. Dotted lines are also used to represent 'short cut' links (A different colour is also used to differentiate shortcut links, but this may not be visible on black and white prints.) Shortcuts are intended as a semantically simplified alternative to a fully developed chain of links. Relations between objects and people, for example, are often handled in this way. The *Acquisition Information* diagram provides both a fully developed link from object to owner via an *acquisition event* and a simplified 'shortcut' link to the *current owner*. The fully developed link allows a detailed ownership history to be recorded. However, this information may not always be required so the shortcut allows for a simplified implementation. Normally, only *one* of the alternative schema would be implemented. The CRM defines ways in which information can be transferred consistently between 'richer' or 'poorer' systems.

3. Entities in the 'type' hierarchy are represented with a magenta outline. (This may not be visible on documents printed in black and white). Put briefly, the type hierarchy serves as an authority list which enhances the granularity of the class hierarchy. For more information about the function of the type hierarchy please refer to *Electronic Communication on Diverse Data – The Role of the oo CIDOC Reference Model (August 1998)*.

Acquisition Information
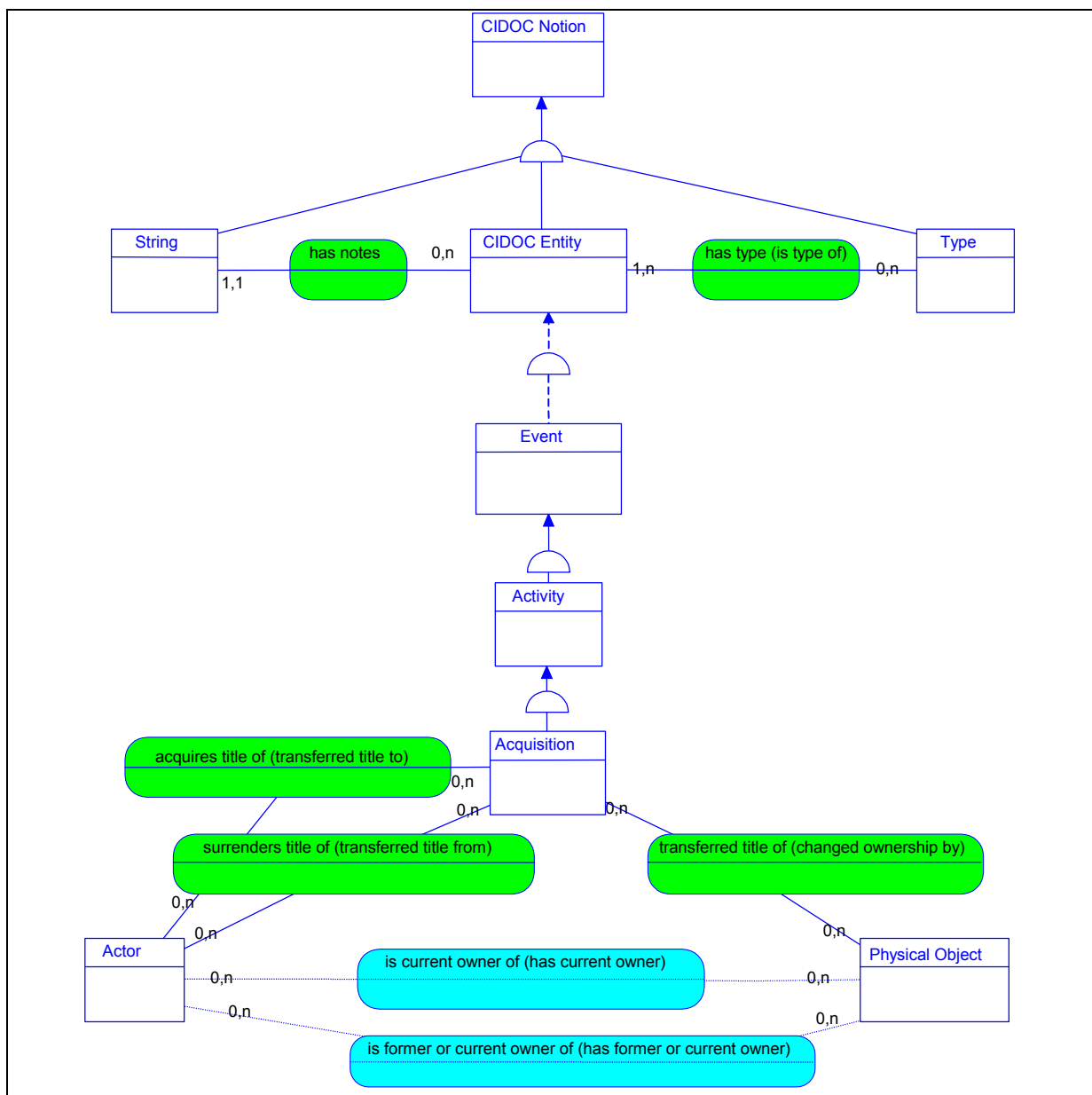
Acquisition Information		Acquisition by the institution is an instance of transfer of legal title.
	Acquisition method	Acquisition method is the acquisition type, inherited from CIDOC ENTITY.
	Acquisition date	Time-span attribute inherited from Period
	Acquisition source	Source is the *transfers title from* link

Condition Information
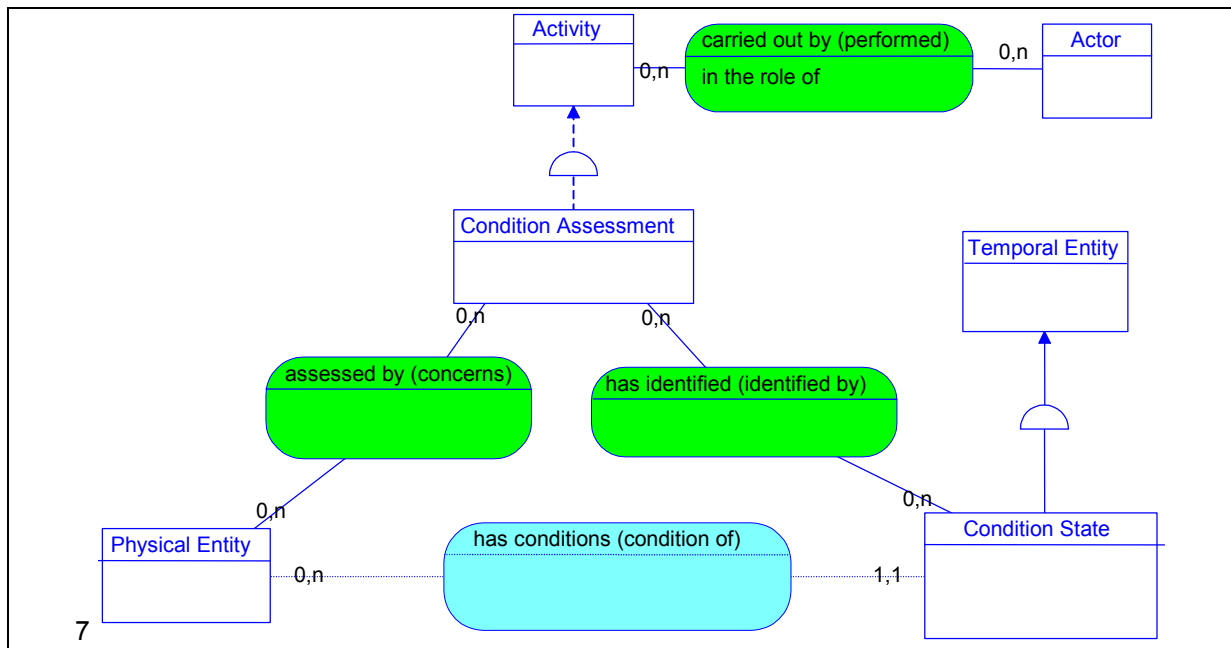
Condition Information		The model includes the notion of condition assessment as an activity, which is not present in the CIDOC Information Categories. NB The motive or purpose of the activity is absent.
	Condition	Type attribute of condition state
	Condition summary	Textual note on condition state, inherited from CIDOC ENTITY.
	Condition date	Time-span of condition state inherited from Period.

Deaccession and Disposal Information

No model		

Deaccession and Disposal Information		We have adopted the following distinctions : • Legal title (ownership) • Physical custody (who keeps the object) • Accessioned - formally recognised as part of the collection. We have decided *not* to model accessioning explicitly. In our opinion accessioning is best modelled as an *extension* to the CRM in order to reflect local practice. (e.g. does the museum 'accession' objects to which it does not have legal title ?) It is the responsibility of each institution and local implementation to declare how their notions of accession and disposal imply transfer of legal title and or physical custody, in order to maintain compatibility.
	Deaccession date	Time-span of 'deaccessioning' event inherited from Period.
	Disposal date	Time-span of 'disposal' event inherited from Period.
	Disposal method	
	Disposal recipient	

Description Information

No model

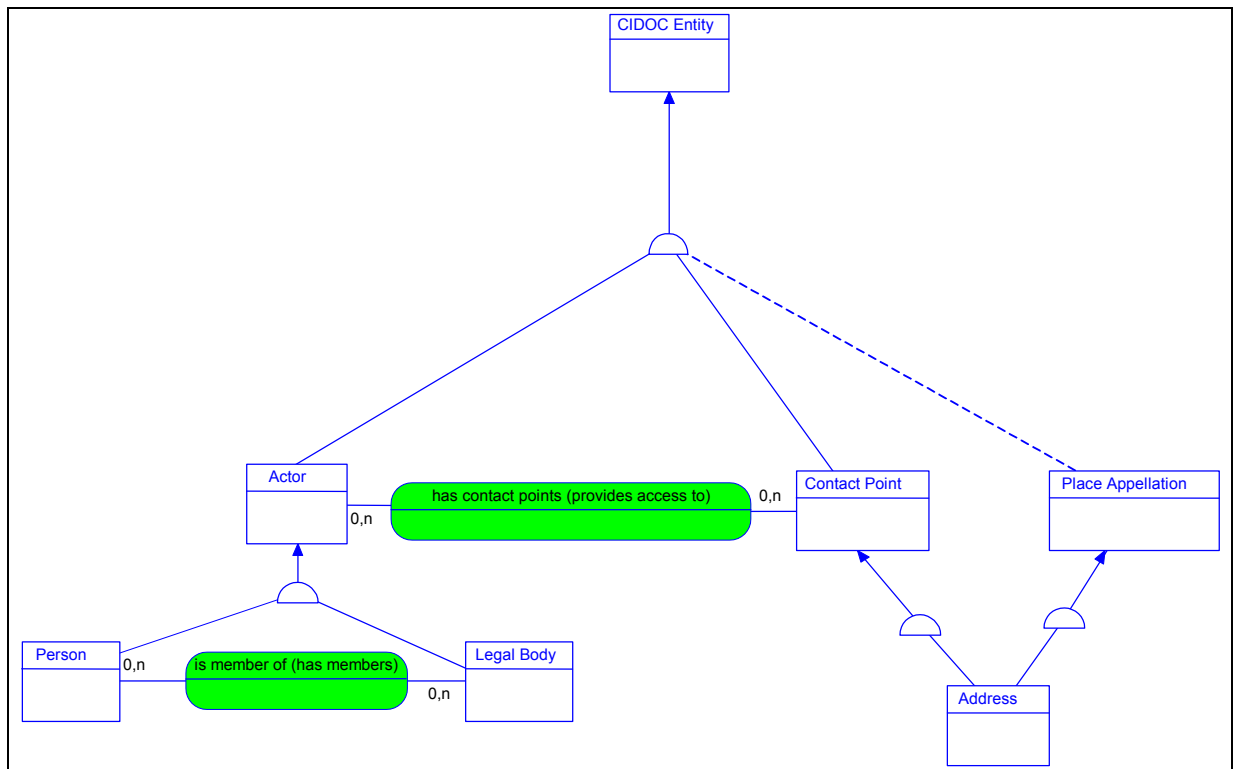| **Description Information**		
	Physical description	Text attribute of the object. (All CIDOC entities automatically inherit a text field attribute.)
	Specimen status	Type, holotype, paratype, etc. This notion is specific to natural history and is currently beyond the scope of the CRM. NB The 'type' status of a specimen does not depend on its physical attributes. Could be considered as the type attribute of the object. However, standard biological taxonomy usually identifies the author and date of the taxon as well. Specimen status is a candidate for domain specific extensions for the future.

Image Information

|		No model

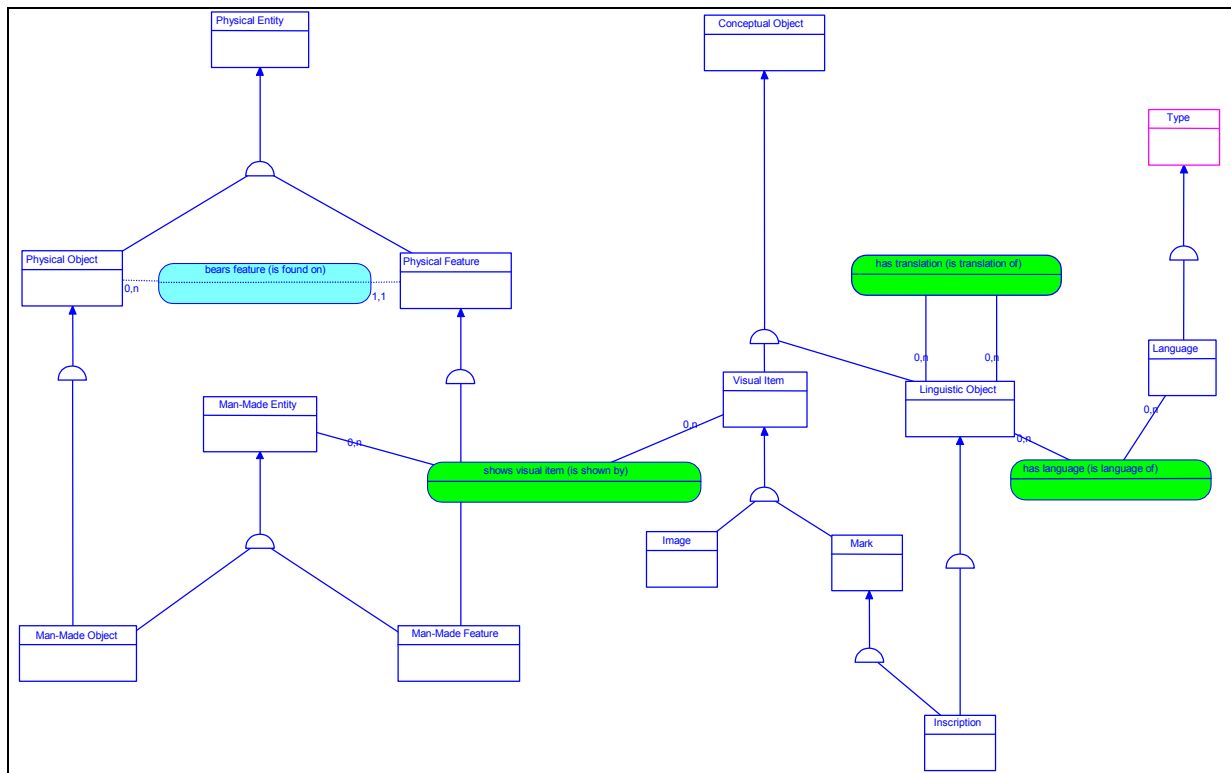| **Image Information**		Images are specialised cases of objects. (A collection object may be an image of another object). The implicit prescription of the CIC that objects *should* be photographed is not represented in the model. However, constraints could be included to enforce good practice. Sound recordings are a sub-class of reproductions. Reproductions or references are two types of relation between objects.
	Image type	Image type is a specialisation of object type.
	Image reference number	Images are objects related to museum objects. A persistent link exists between the two. This link effectively means that a photograph or picture is a 'faithful' representation. (Information about the event leading to the creation of the photo is implicit, ie author and date, etc.). The reference number itself is a specialisation of object number.

Institution Information

Institution Information		The CIC is unclear as to whether this information refers to the current *owner* of the object, the current *keeper* of the object, or possibly the *recorder* of the object information. All of these are modelled elsewhere. Institution is a subclass of Actor
	Institution name	Name attribute of the actor
	Institution sub-body name	idem
	Institution address	Place (Address) attribute of the actor
	Institution country	idem

Location information
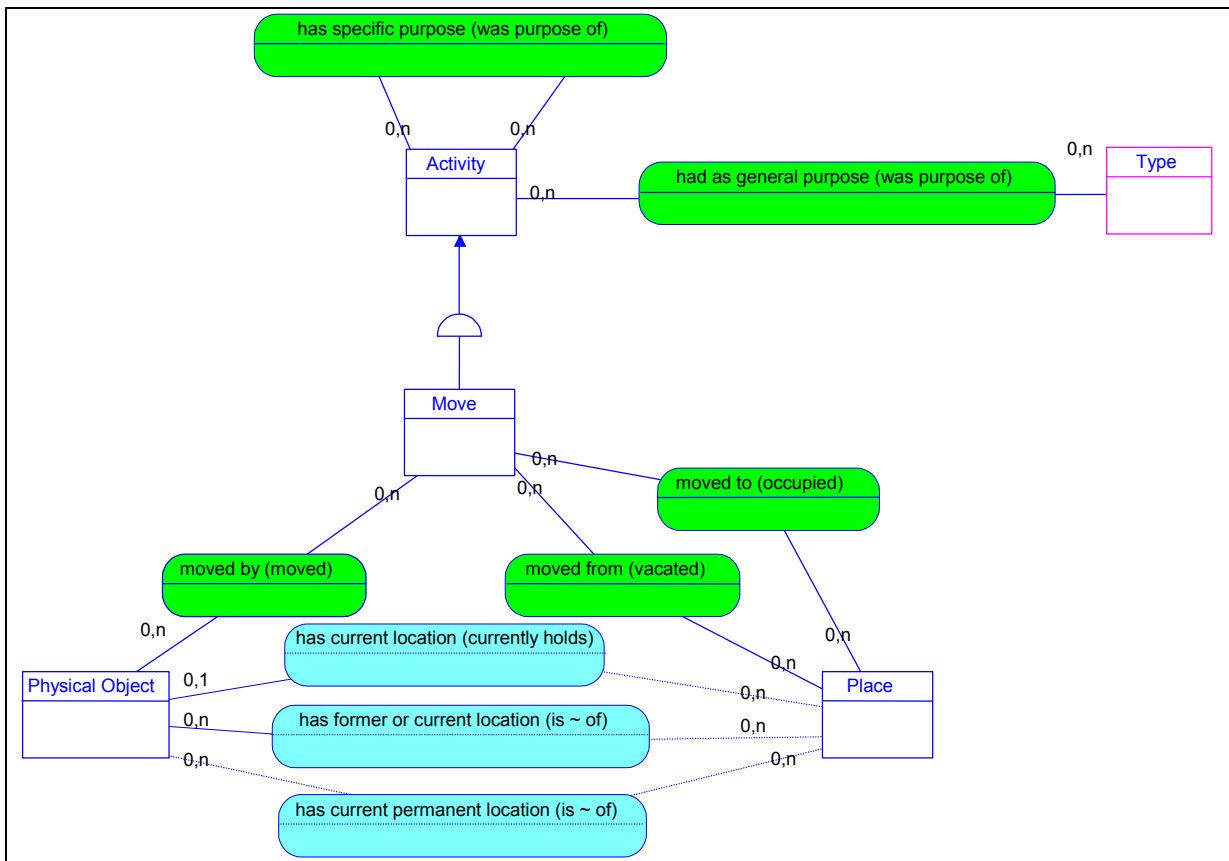
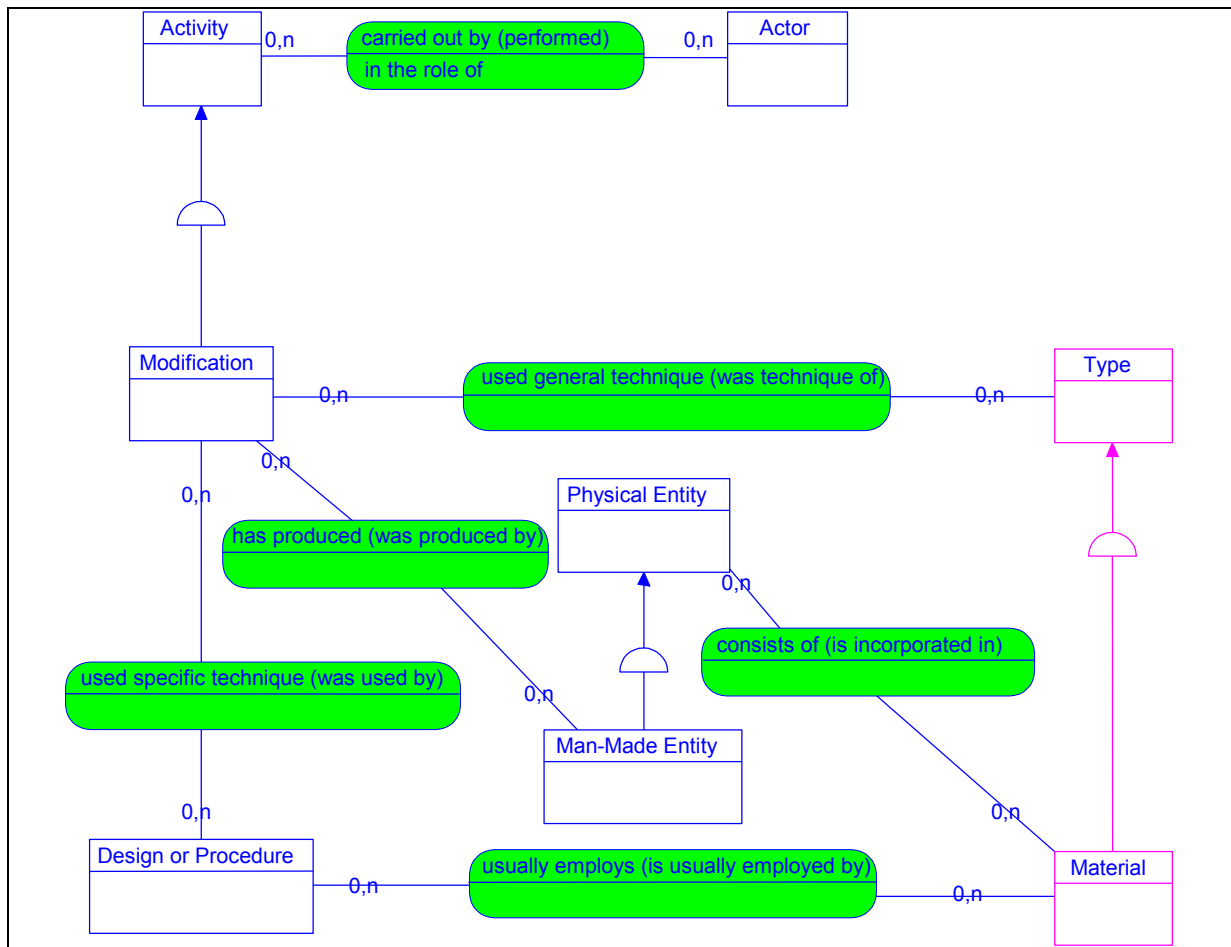| Location Information		A history of 'move' events.
	Current location	Derived from the location history or as a 'shortcut' relation between object and location.
	Current location date	Time-span attribute of a *Move* event
	Current location type	Inherited *Type* attribute of location (!)
	Normal location	Current permanent location short cut link.

Mark and Inscription Information

| Mark and Inscription Information		Marks and inscriptions are interpreted as 'conceptual objects' ie intellectual information which is carried by a physical object. The CIC does not deal with marks such as scratches which have no semantic significance.
	Mark/inscription text	Textual transcription of the mark or inscription. Clear rules need to be stated as to how marks should be transcribed or transliterated.
	Mark/inscription type	A distinction is made in the model between marks in general and inscriptions, which have linguistic attributes. Further classification of inscription types could use the class 'type' field.
	Mark/inscription description	Text field attribute of the mark.
	Mark/inscription technique	This information could be included as part of the text attribute of the 'shows visual item' link. Alternatively a specific attribute might be used if the information is used as an access point.
	Mark/inscription position	This information could be included as an attribute of the 'shows visual item' link. A specialised piece of information if used as an access point.
	Mark/inscription language	Language attribute of the inscription.
	Mark/inscription	Translation attribute of the inscription.

	translation	

Material and technique Information

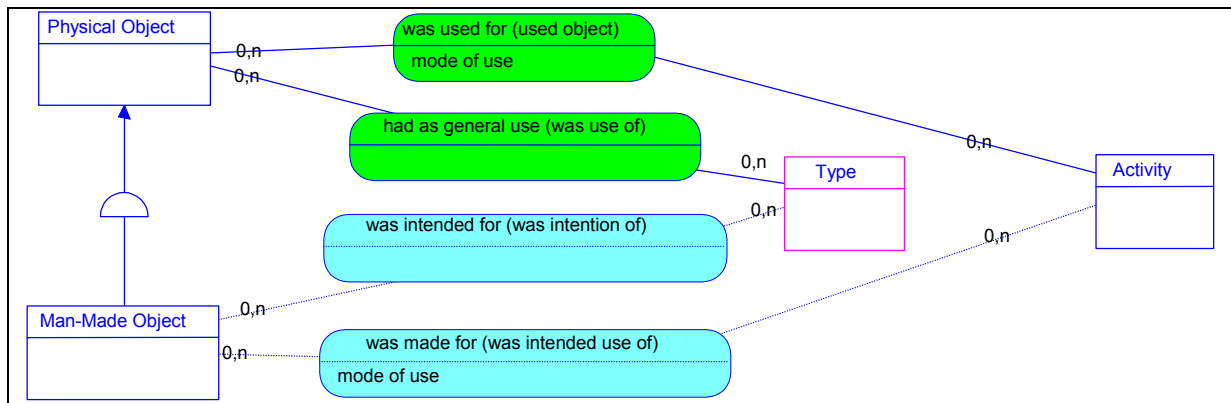| Material and Technique Information		
	Material	Material class form the type hierarchy
	Technique	Common techniques can be handled through the *general technique* link as *Types*. Specific techniques can be documented using the *Design or Procedure* class. This defines or describes the way in which a production activity is carried out and the materials used. e.g. architectural plans, assembly instructions, recipes, designs, traditional techniques.
	Part or component description	Parts can be of different types.. integral, separable, etc.

Measurement Information
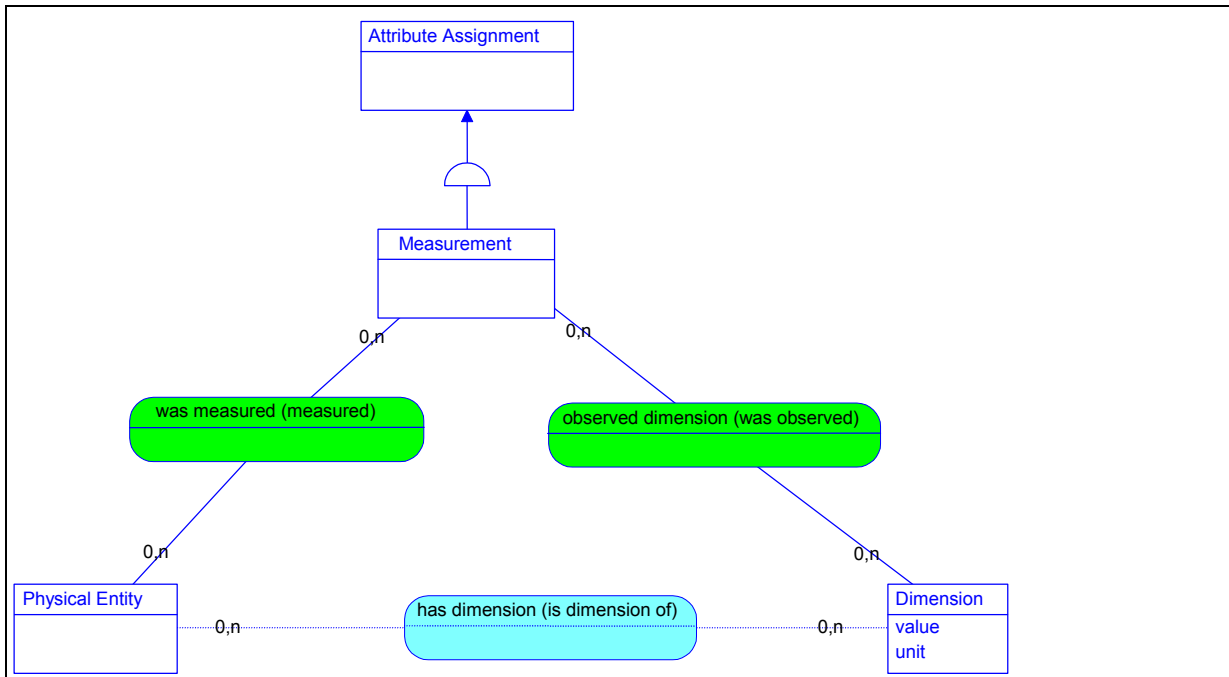
| **Measurement Information**		Measuring something is interpreted as an act of attribute assignment. The measurement history could be recorded as a textual object if not required as an access point.
	Dimension	'Value' attribute of the Dimension entity
	Measurement	
	Measurement unit	'Unit' attribute of the Dimension entity.
	Measured part	Inherited Type attribute of the Dimension entity.

Object Association information

Object Association Information		A history of events associated with the object. This is open to specialisation. (The model shown here illustrates the notion of 'original function').
	Associated place	Modelled elsewhere with specific relations.
	Associated date	Modelled elsewhere with specific relations.
	Associated group/person name	Modelled elsewhere with specific relations.
	Association type	
	Original function	Was used for - actual instance of use Had as general use - activity type Was made for - event instance (intended use) Was intended for - activity type.(intended use) See diagram below... (function use)

Object collection information
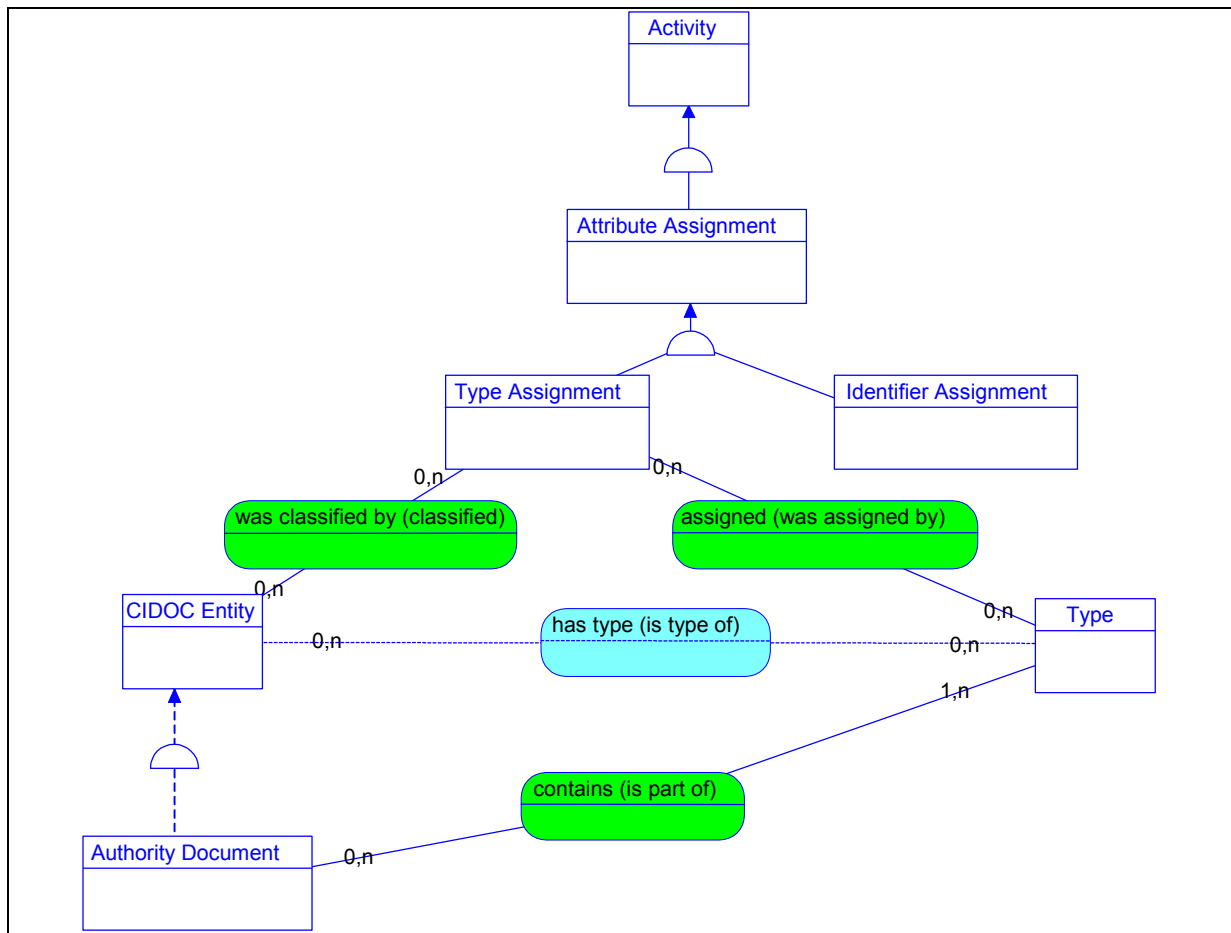
No model

Object Collection Information		Could be seen as initial event in ownership history (provenance). (Collecting is a specialisation of an acquisition event.) Or as initial transfer of physical custody, or both.
	Collection place	inherited from *Physical Context*
	Collection date	*Time-Span* inherited from *Period*.
	Collector	*Actor* who acquires the object
	Collection method	type of collection method - link to *Type* hierarchy. (e.g. excavation, trapped, stolen)

Object Entry Information
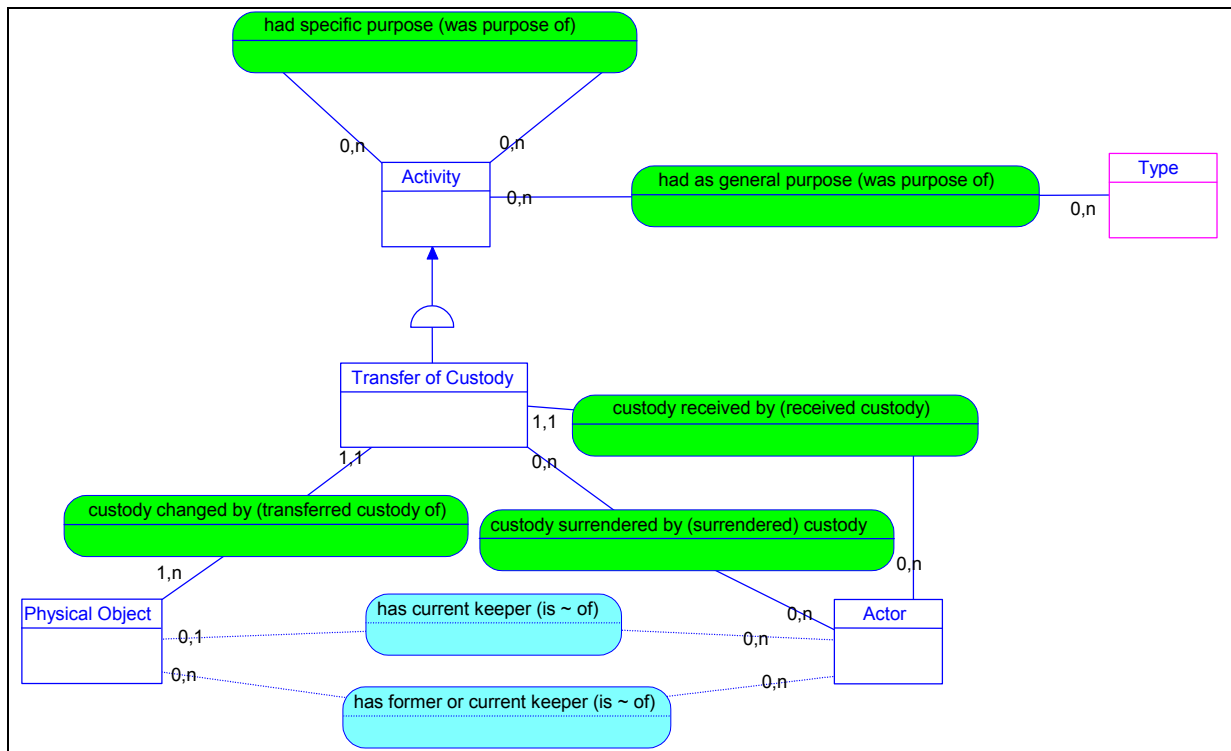
| Object Entry Information		Transfer of physical custody of an object. Object entry and exit are two relative views of transfer of custody.
	Current owner	Interpreted as current owner at moment of transfer. Iff data consistency is guaranteed, current owner may be derived from the ownership history. Otherwise a specific link is needed.
	Depositor	Actor who surrenders custody of the object
	Entry date	Time-span attribute of *Transfer of custody*
	Entry number	Object identifier assigned as a result of the transfer event. Either multiple instantiation or multiple inheritance (*transfer of custody* and *identifier assignment*) depending on the organisation's practice. Another possibility : two events grouped by *consists of* link.
	Entry reason	General and specific reasons for the transfer taking place : an activity type and a specific activity. NB The specific purpose of an activity should not usually be the same instance as the activity itself.

Object Name Information

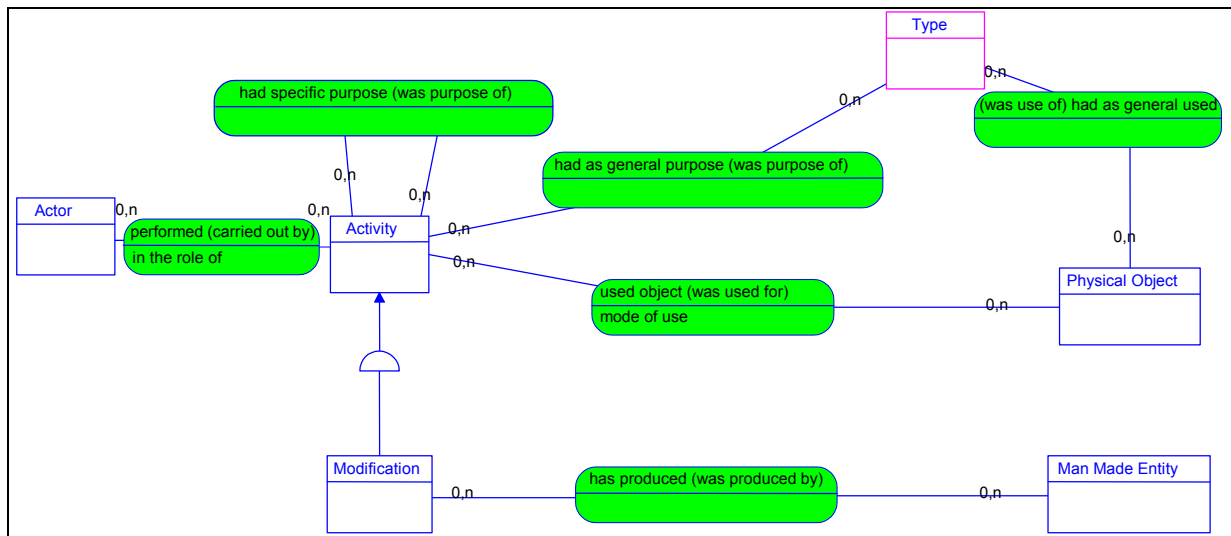| Object Name Information		The term 'name' is ambiguous. It can be interpreted as the *proper name* or *title* of an individual item, or as a *type* or *class* of items. A proper name arbitrarily identifies a particular item, whereas a class identifies a set of items with common characteristics. e.g. 'La tour Eiffel' is a proper name, whereas *tower* is the class of all towers, which can would be expected to share common properties. We propose to use Object *Type* (instead of object name, category, classification, etc.) to refer to classes of objects. Object *Appellation* refers to arbitrarily assigned names, titles, numbers or other tokens used to refer to an individual item. If an appellation refers uniquely, within a certain context, to an individual item, it can be considered as an *Identifier*.
	Object name	*CIDOC Type* of an object
	Object name type	The *Type* of the *Reference Document* used. In order to enable interoperability, it is essential that type systems refer to a specific *Reference*

		Document. (This can be stated a) for the entire scope of the database or b) for individual database fields or c) per term, as modelled here.) It is strongly recommended that local, 'ad hoc' systems correlate their terms to a known reference system. (Within the context of the CIDOC reference model, ad hoc systems are considered to be *Reference Documents*.)
	Object name authority	*Actor* responsible for the *Type Assignment*

Object Number Information
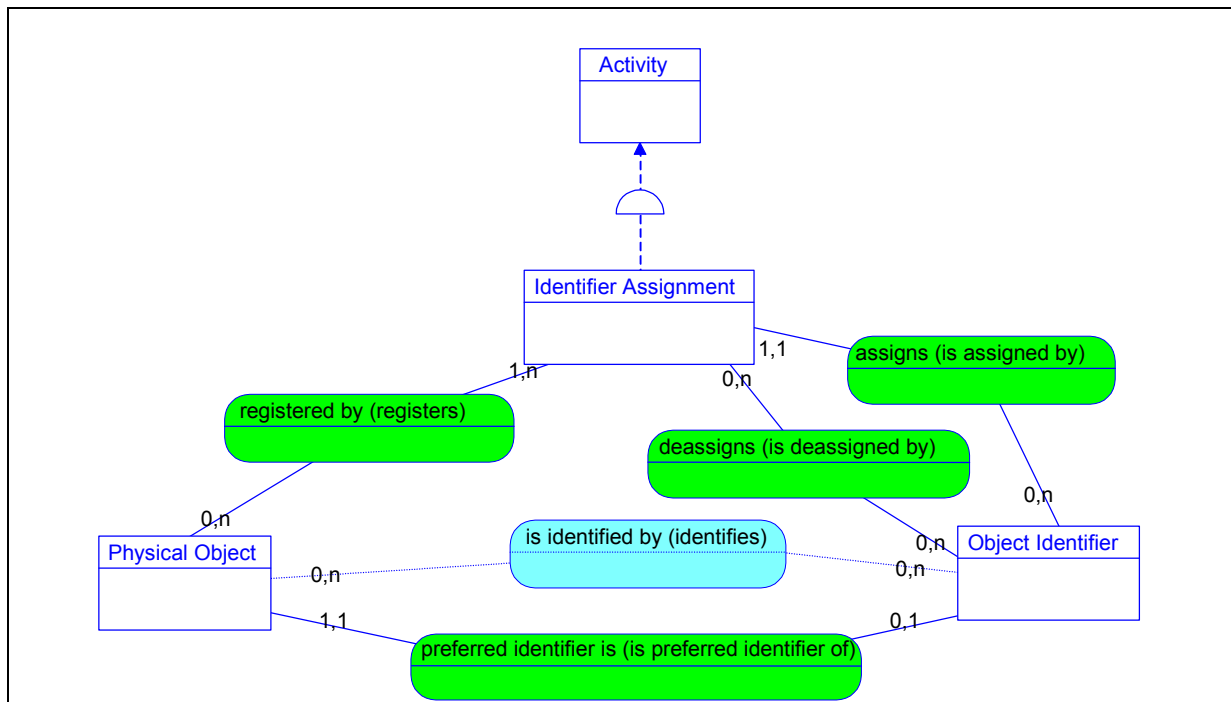
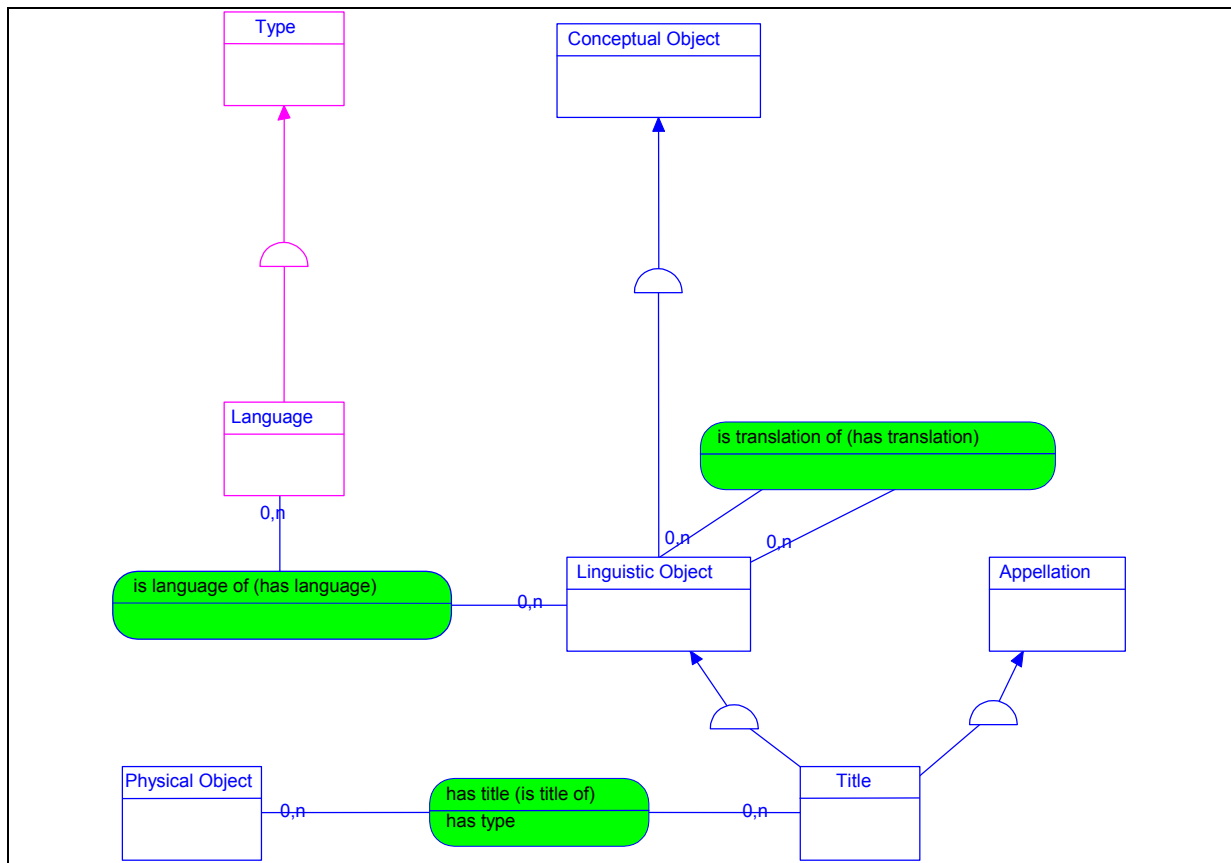| Object Number Information		Only one identifier should be used. Associating date and type complexifies the identifier which should be separated into other, non preferred, numbers.
	Object number	Object number is an instance of the class Object Identifier. An identifier is a token - a number or string, which is arbitrarily assigned to an object for use as an identifier. An object identifier should be uniquely assigned to each object. Each identifier has a certain scope and context - the environment in which it is unique. e.g. The Smithsonian 1956-1996.
	Object number type	The object identifier type - inherited from CIDOC-ENTITY
	Object number date	Time-span of the identifier assignment.

Object Production Information

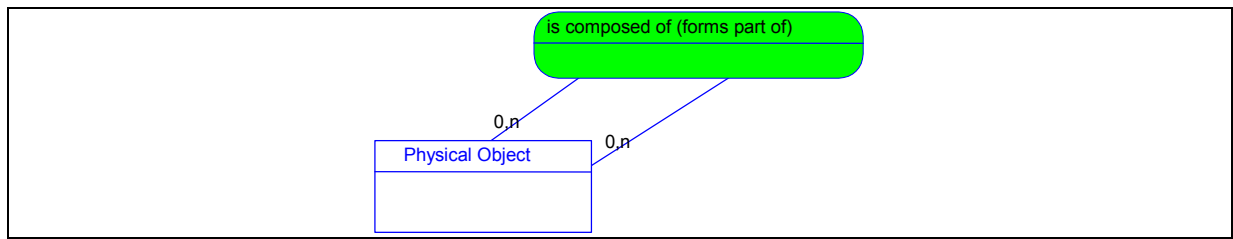| Object Production Information		Creation of an object. - an intermediate 'rôle' class could be used between production and actor. This would allow for specialisation of the relation.
	Production place	Inherited from activity
	Production date	idem
	Production group/person name	actor
	Production rôle	How someone contributed to the creation. Rôle of the *performed* relation.

Object Title information

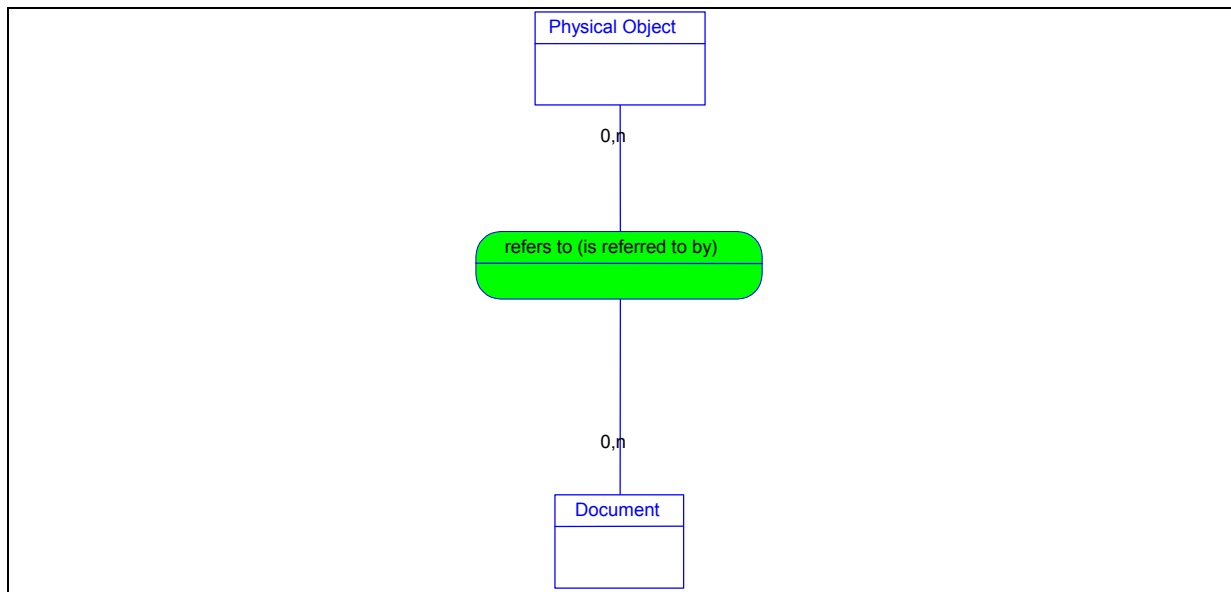| Object Title Information		Title is a subclass of linguistic object (itself a subclass of conceptual object) from which it inherits 'linguistic' attributes. Translations are also linguistic objects. Title is also a subclass of Appellation from which it derives its 'naming' aspect.
	Title	String attribute of Title entity
	Title type	Type of title is an attribute of the 'has title' link.
	Title translation	Translation attribute inherited from linguistic object.

Part and component Information

Part and Component Information		This information could be treated as a sub field of the physical description.
	Number of parts or components	Can be calculated for physical component parts which use the *is composed of* link. However, for sets of items, like a pack of cards, for which analysis into components would be unnecessary, a formal *number of parts* field can be used when the inventory count requires. In either case, the total number of parts must reflect inventory practice.
	Description of parts and components	Inherited text attribute.

Recorder Information

See model for Object name Information Group

Recorder Information		*Attribute Assignment* is a potential hook-in point for information about the recorder of the information. However, using the note field for this purpose is preferred.
		It is recommended that the system should record the author and date of information entry. However, this information need not be available as an access point
		For the purposes of external access, 'version' information should be generated dynamically as a database 'signature' • Generate dynamically a 'database' signature : e.g. SIBIL GENEVA 20/4/1997, at moment of retrieval • Finer granularity ... text format.
		Who is the 'author' ? The authority should be distributed, rather than the person responsible for data entry.
	Recorder	Optionally per object record Dynamically per database
	Record date	idem
	Authority	controller, supervisor,

Reference information

Physical Object

0,n

refers to (is referred to by)

0,n

Document

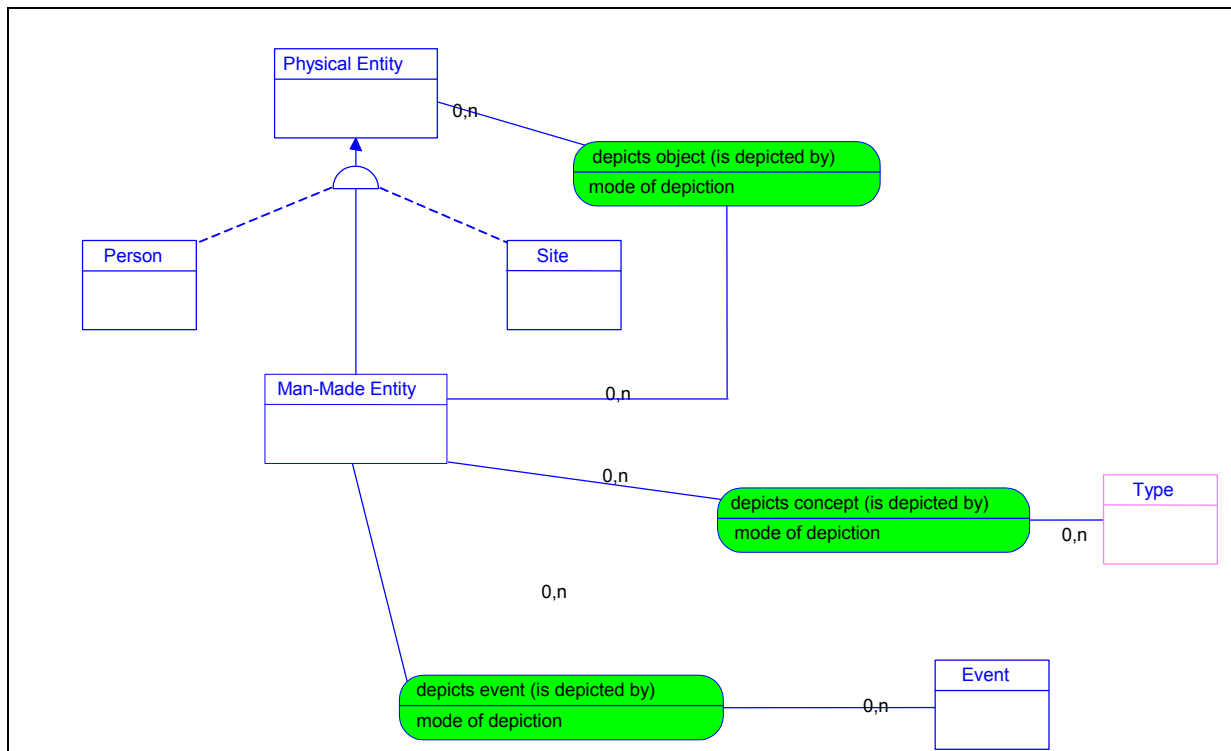| Reference Information		
	Reference	Link from *Document* to *Object*. Documents may, of course, refer to things other than objects. However, in the present context, only the documentation of museum objects is of relevance.
	Reference type	*Type* attribute of *Document*, inherited from CIDOC entity.

Reproduction Rights Information
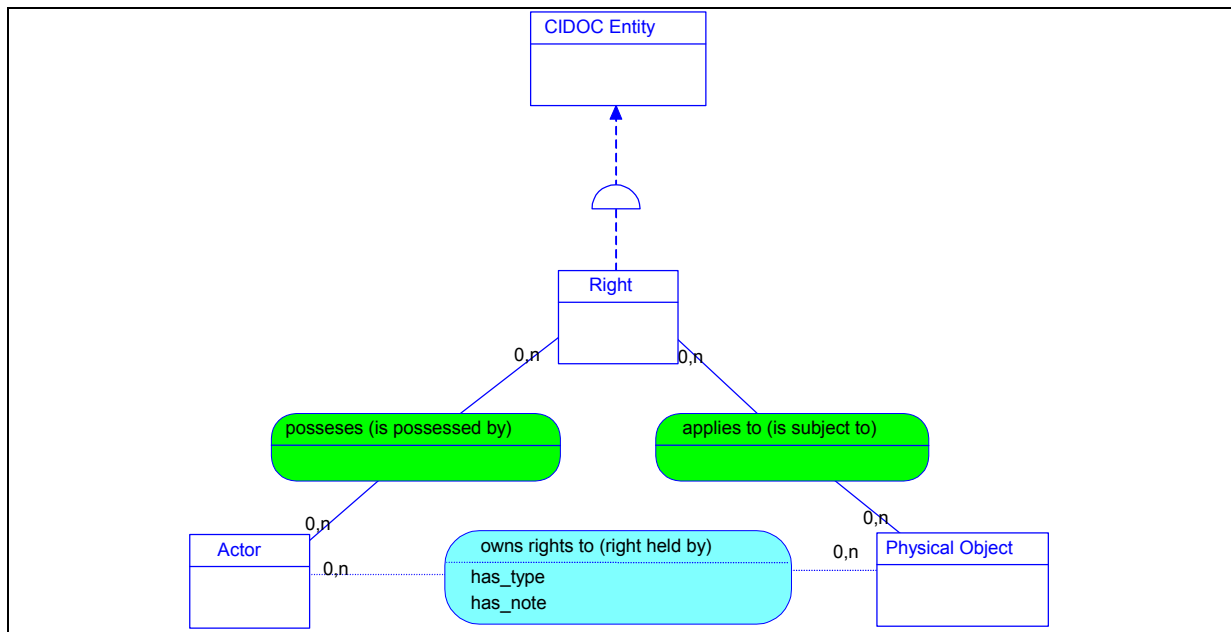
Reproduction Rights Information		This information could be generalised to include all 'rights' granted to an actor concerning an, object or intellectual object, type of right and description. (text)
	Reproduction rights note	Inherited text attribute of 'Rights' entity
	Reproduction rights owner	Actor

Subject depicted information

Subject Depicted Information		Concerns any man-made object which depicts another object, event, concept or place. E.g. a photograph, painting, engraving, coin, etc.
	Subject depicted	Links *depicts concept* (Link to *Type*), *depicts event* and *depicts object.* Each of these links has a Mode of depiction attribute, which allows the *way* in which the iconographic object represents : as main subject, incidental subject, etc.
	Subject depicted description	Text attribute of the iconographical object, inherited from CIDOC Entity.

CRM class hierarchy
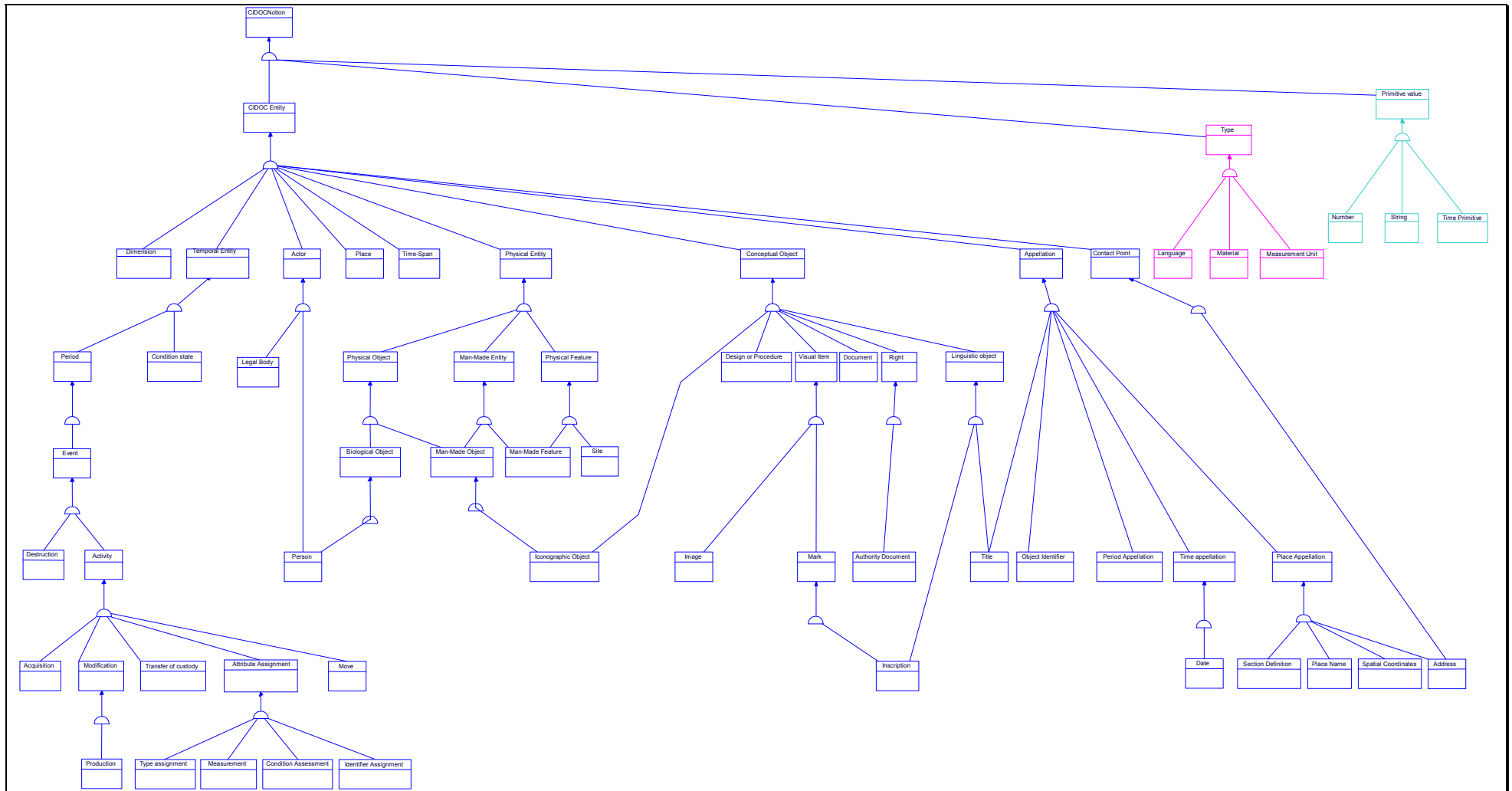
Documentation

Guidelines for Museum Objects - CIDOC Information Categories (June 1995)
Notes on the transformation of the CIDOC relational data model (July 1996)
Introduction to object oriented modelling (September 1996)
Preliminary Definition of the CIDOC Reference Model (Revised May 1998)
Electronic Communication on Diverse Data – The Role of the oo CIDOC Reference Model (August 1998)

Web site : http://www.ville-ge.ch/musinfo/cidoc/oomodel/