



CEN/ISSS WS/LT
Learning Technologies Workshop

**Availability of alternative language versions of a
learning resource in IEEE LOM**

-- PROPOSED FINAL DRAFT --

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Contents

1	Scope.....	6
2	Normative References	7
3	Definitions and abbreviations	8
3.1	Definitions	8
3.2	Abbreviations	8
4	Stakeholders and possible usages.....	9
5	Learning Objects, LOM instances and Translations	10
5.1	Possible relationships between learning objects (LOs) representing different language versions	10
5.2	Relations between alternative language versions.....	11
5.3	Learning Objects without a LOM instance	12
6	Data model	13
6.1	Relationship between LOMs describing different language versions of a Learning Object.....	13
6.2	Language of a related learning objects.....	14
6.3	Additional contributors	15
6.4	Identification of related learning objects	15
6.5	Quality and status of a translation.....	16
7	Usage Examples	17
7.1	Learning Objects with multiple language entries	17
7.2	Learning Objects without a LOM instance	17
7.3	Finding all language versions of a Learning Object.....	18
7.4	Simple existence of Alternative Language Versions.....	19

Foreword

This CEN Workshop Agreement (CWA) outlines a Programme for the " Availability of alternative language versions of a learning resource in IEEE Learning Object Metadata". The delivery of this document was formally accepted as part of the work programme of the CEN/ISSS Workshop on Learning Technologies (WS/LT) titled "A standardization Work Programme for Learning and Training Technologies & Educational Multimedia Software" published on the 14th July 2000.

This work is directly related to the European Commission's Mandate M/280 "Standardisation mandate to CEN,CENELEC and ETSI in the domain of 'Learning and Training Technologies & Educational Multimedia Software'", covering the development of a work plan for standards related activities in relation to Learning Technologies. The agreed work plan was published as CWA 14040 and has also been successfully presented to an open CEN/ISSS meeting on 5th and 6th October 2000.

In addition, this work relates closely to the Memorandum of Understanding on "Multimedia Access to Education and Training in Europe".

The document has been developed through the collaboration of a number of contributing partners, representing a wide mix of interests, from universities to commercial companies representatives.

The final review/endorsement round for this CWA was on the 2002-xx-xx. The final text of this CWA was submitted to CEN for approval and publication in xxxxxxxx.

Introduction

This report was prepared by an appointed Project Team within the CEN/ISSS Learning Technologies Workshop.

IEEE LTSC Learning Object Metadata is the commonly accepted global standards solution concerning descriptive information of Learning Objects through metadata. Because of their role in indexing and retrieving of resources, standardized metadata are vital to the education sector. There is a need for ensuring that the IEEE LTSC LOM, as the globally accepted solution, is capable of dealing with specific European requirements, such as cultural and multilingual issues.

The need to establish a Project Team (PT) on "Availability of alternative language versions of a learning resource in IEEE LOM " has been identified in the Business Plan approved in March 30th, 2001 in order for specific standardization actions that permit the identification of alternative versions of resources, in different languages, as well as the origin of the translation in metadata based on the IEEE LTSC LOM specification, to be proposed.

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Typographic conventions used in this document

Proposed additions and usage guidelines to the LOM standard are printed in ***bold italics***.

First usage of special defined terms is printed in *italics*.

Guideline:	Guidelines of the CEN Workshop are printed in bold within a grey indented text box.
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1 Scope

The present document establishes an application profile of the IEEE LTSC LOM, which supports the indication of the availability of alternative language versions of a learning resource. It gives guidance on standardization actions that permit the identification of alternative versions of resources, in different languages, as well as the origin of the translation in metadata based on the IEEE LTSC LOM specification.

2 Normative References

The following normative documents contain provisions that, through reference in this text, constitute provisions of this CWA. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this CWA are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies.

IEEE 1484.12.1-2002, Final Draft Standard for Learning Object Metadata (approved on June 12, 2002, by the Standards Board of the IEEE Standards Association)

(http://ltsc.ieee.org/doc/wg12/LOM_1484_12_1_v1_Final_Draft.pdf)

ISO 639 Code for the representation of names of languages

(<http://www.iso.org/>)

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

alternative language version

translation of an *original language version*. The alternative language version is always a derivate of an original language version.

derived version

version of a Learning Object which was produced by applying a transformation (in our context a translation) to a *source version*.

original language version

original version of a Learning Object which is the source of all its translations (i.e. its *alternative language versions*). The original language version can also be a single LOM instance which is instantly available in several languages (this is e.g. true for European standard documents).

source version

source of a transformation, which leads to a *derived version*

3.2 Abbreviations

CEN	Committee Européen de Normalisation
CBT	Computer Based Training
CWA	CEN Workshop Agreement
DCMI	Dublin Core Metadata Initiative
LO	Learning Object
LOM	Learning Object Metadata
LOM instance	One set of Learning Object Metadata, describing a unique Learning Object
WBT	Web Based Training

4 Stakeholders and possible usages

The translation of Learning Objects into alternative versions and the retrieval of such versions leads to several different aspects to be introduced in the Learning Objects Metadata (LOM) of the Learning Objects and their translations. For each of these aspects, possible and suggested solutions will be introduced in the upcoming sections.

In order to be able to classify the suggestions and guidelines of this CWA, this chapter introduces the several stakeholder groups involved in the translation of Learning Objects and availability of alternative language versions, each of which should refer to specific parts of the CWA.

The guidelines presented in this CWA will then state the applicability for the different stakeholder groups in the entry "Applicable for".

In the following table, the needs of the different stakeholder groups are briefly summarized:

Name	Description of use and special interest
Translation management	People interested in the translation process itself and the management of this process. Information needed is e.g. who did translations, how are the different versions based on each other, which is an original, which a derived version.
Alternative version query	People interested in the fact which alternative versions exist for a given learning object, e.g. for use in citations or to catalogue the versions.
Specific language version query	People interested in finding a specific (or a set of specific) language version for a given learning object, e.g. based on their own language profile.

5 Learning Objects, LOM instances and Translations

This chapter clarifies the scope of this CWA by describing the several possible relations between different language versions of a resource and the subset of these relations that the CWA intends to cover, i.e. which of them seem to make sense in the context of Learning Objects. It carries on with the specification of the several kinds of relations between alternative language versions of Learning Objects.

5.1 Possible relationships between learning objects (LOs) representing different language versions

The following figure illustrates some possible relationships between different language versions of a Learning Object:

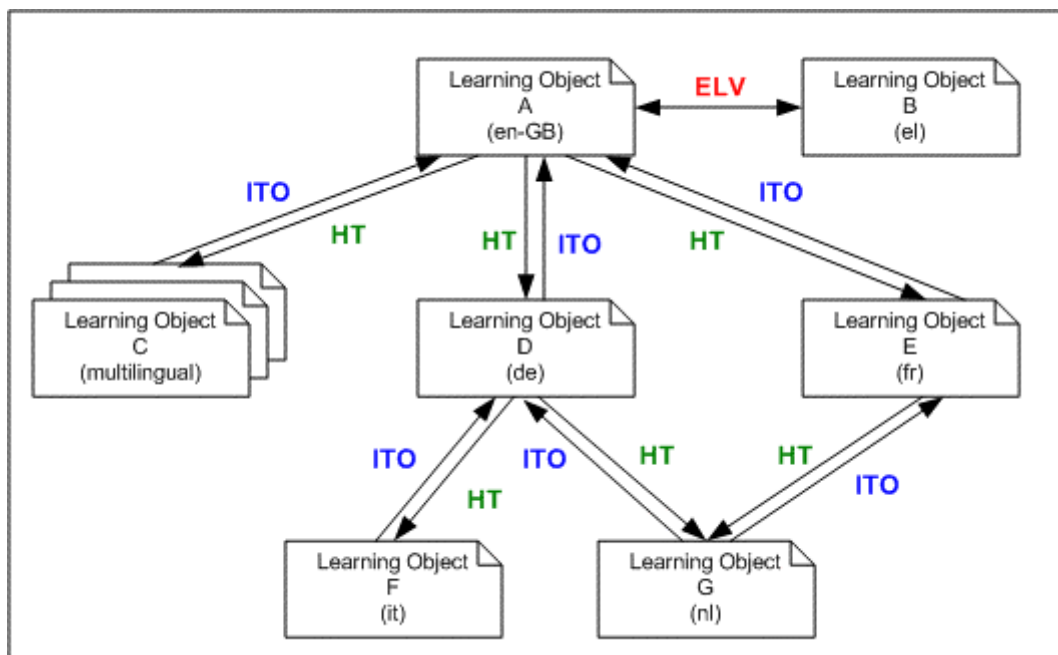


Figure 1. Possible relationships between different language versions of a LO

Let's assume the original language of the Learning Object "A" is English (en-GB). The figure illustrates that there are three direct translations (relation "*istranslation*"; ITO and "*hastranslation*"; HT) of this Learning Object, namely the learning objects "C", "D" and "E", as well as the "equivalent" (relation "*equivalentlanguageversion*"; ELV) version "B".

There are two additional alternative language versions, which are derived indirectly from the original language version, namely the Italian and Dutch versions "F" and "G". Notice furthermore, that "G" is derived from two sources.

All shown versions are alternative language versions to each other, so all of them are in the relation "*hasalternativelanguageversion*" (HALV) to each other.

Please note that Figure 1 shows an example for the possible relationships between **Learning Objects**. It is important to distinguish these relationships from the relationships between LOM instances, since Learning Objects are not necessarily assigned one or more LOM instances.

All of these relations are covered by the guidelines presented in this CWA. As one can see, things can get complex very fast, therefore the guidelines will probably demand more information than it is applicable in a given context. The application of the guidelines therefore has to be decided on a per-case basis. To give some help on this, the possible usage for each guideline is stated. Pros and cons of a guideline are discussed in the text around the guideline where appropriate.

For the information to be helpful, it is desirable to have as much information as possible available about alternative language versions.

Guideline:	Every alternative language version of a specific Learning Object should be identified in the LOM of this Learning Object.
Applicable for:	All usages

In general, every alternative language version of a Learning Object should be considered as a new Learning Object, and therefore should be described by an individual LOM instance.

Guideline:	Use a separate LOM instance for every translation of a Learning Object whenever possible.
Applicable for:	All usages

Sometimes, as the above guideline implies, it is not possible to identify translations as separate Learning Objects. For example, this is true for complex Learning Objects like a multilingual CD-ROM or a Flash movie. Since in this case there is only one technical representation of the Learning Object, one LOM instance with multiple “1.3 Language” entries should be used to describe it.

Beware that using one LOM instance for a multilingual Learning Object, as recommended, could easily arise another problem regarding the “2 Life Cycle” entries. There are probably different values for the several languages covered by the Learning Object. Therefore, this approach should only be used if the several language versions do strictly reside within one Learning Object.

Guideline:	Use a single LOM instance with multiple language entries and multiple contribution entries if you are describing a Learning Object that represents different language versions within one instance (e.g. a multilingual Flash movie or a multilingual CD-Rom).
Applicable for:	All usages

5.2 Relations between alternative language versions

This paragraph describes the possible relations between alternative language versions of Learning Objects and their LOM instances.

Since a translation of a Learning Object is (or at least should be) simply the representation of the same content in a different language, the metadata related to the translation should describe the translation, not the Learning Object itself. This is especially true for the contributing roles that deal with quality issues, like “*validator*”. The LOM profile suggested by this CWA will therefore narrow on metadata for describing the requisite information and relations about alternative language versions.

In general, the original language version and the alternative language version should be linked by using the relation types “*istranslationof*” and “*hastranslation*”, introduced by this CWA.

Linking the LOM instances by a two-way translation does introduce redundant data, so it is only applicable if you have full access to the metadata of all learning objects. Furthermore, the redundancy might introduce update problems, especially if the metadata is distributed across several systems. This guideline is important for people mostly interested in the translation process itself.

Guideline:	Link the original resource to its alternative language version using a two way relation, identified by the “<i>hastranslation</i>” and “<i>istranslationof</i>” entries of the LOM of these resources respectively.
Applicable for:	Translation management

There are some cases in which several language versions of a learning resource need to be considered as being equivalent, i.e. all are original versions. For example, this is the case for European standards

CWA NNNNN (or the Working Document Identifier Number)

documents, which are published in English, French and German at the same time. As recommended above, every single translation should have a LOM instance of its own.

Guideline:	If there are several identifiable Learning Objects in different language versions that are all considered original, use a separate LOM instance for every translation and chain these resources together by using the “<i>equivalentlanguageversion</i>” LOM entries of all related resources.
Applicable for:	Translation management

Sometimes you might not be interested in describing the exact relationships between language versions, but only in the fact that there are different versions available. For this simplified case, you can use a more simple approach which doesn't handle information about translations but only about the availability of alternative language versions.

Guideline:	If you are only interested in the list of alternative versions and not in the translation process, you may use the simplified relation “<i>hasalternativelanguageversion</i>”.
Applicable for:	Alternative Version Query, Specific Language Version Query

Having several LOM instances for a specific content represented in alternative language versions leads to information redundancy within the respective LOM entries. This fact raises an issue, for example in the case where some entry of the LOM needs to be updated. The issue can be clearly resolved with the use of an explicit identification mechanism for LOM instances, in order to be able to traverse the dependency graph between the related LOMs.

5.3 Learning Objects without a LOM instance

Not every Learning Object you may want to use or refer to has to have its own LOM instance. Sometimes it might even be impossible to create such instances, e.g. if you refer to Learning Objects from another institution.

However, alternative language versions without a LOM instance should appear as relationship entries of Learning Objects which do have LOM instances.

In this case, a traversal of LOM instances, as described in section 6.1, of course is not possible.

Guideline:	Include all Learning Objects in the relationship entries, even if the alternative language version you refer to doesn't have its own LOM instance.
Applicable for:	Alternative Version Query, Specific Language Version Query

6 Data model

This part of the CWA describes the LOM elements that should be used in order to support identification of alternative language versions of a learning resource and specify information related to the translation.

6.1 Relationship between LOM instances describing different language versions of a Learning Object

The relationship between different language versions is directed in case of “*istranslationof*” and “*hastranslation*”, i.e. there is a *source version* and a *derived version*, whereas the relationship types “*equivalentlanguageversion*” and “*hasalternativelanguageversion*” are not directed, i.e. both ends of the relation are considered equal.

To express the relationship, the LOM data element “7. Relation” shall be used:

Nr	Name	Value Space	Suggestions / Comments
7	Relation	-	
7.1	Kind	Based on Dublin Core: ispartof: is part of haspart: has part isversionof: is version of hasversion: has version isformatof: is format of hasformat: has format references: references isreferencedby: is referenced by isbasedon: is based on isbasisfor: is basis for requires: requires isrequiredby: is required by <i>istranslationof</i> : <i>is translation of</i> <i>hastranslation</i> : <i>has translation</i> <i>equivalentlanguageversion</i> : <i>equivalent language version</i> <i>hasalternativelanguageversion</i> : <i>has</i> <i>alternative language version</i>	Value Space should be extended in order to include the relationship between translations and equivalence classes of a Learning Object
7.1.1	IsOriginal	true false	Optional. If in 7.1 the relation kind “hasalternativelanguageversion” was chosen, this optional entry can mark the original version.
7.2	Resource	-	Required to identify the related learning object.
7.2.1	Identifier	-	Optional.
7.2.2	Description	-	Optional.
7.2.3	Language	See 1.3: General.Language	Optional.

CWA NNNNN (or the Working Document Identifier Number)

Note that the identification of the related learning object is not necessarily done through the entry “7.2.1: Identifier”, although this is strongly recommended, because this unique identifier may not even exist. You may, however, put a less formal identification of the related learning object into “7.2.2: Description”.

To deal with the proposed value space of element 7.1 for our purpose, we introduce two new values, namely “*istranslationof*” and “*hastranslation*” to explicitly express a foreign language translation.

Guideline:	Use the relations “<i>istranslationof</i>” and “<i>hastranslation</i>” to express the translation relation of several Learning Objects in their LOM instances.
Applicable for:	Translation management

Furthermore, we introduce the value “*equivalentlanguageversion*” to express semantically equivalent versions in different languages.

Guideline:	Use the relation “<i>equivalentlanguageversion</i>” to express an equivalence class of Learning Objects in different languages which are considered equal with respect to translations.
Applicable for:	Translation management

To simply express the fact that there is an alternative language version, without caring about the translation process itself, one can use the value “*hasalternativelanguageversion*” for the relation of the Learning Objects.

Guideline:	Use the relation “<i>hasalternativelanguageversion</i>” to express the fact that one or more translations exist.
Applicable for:	Alternative Version Query, Specific Language Version Query

If the relationship “*hasalternativelanguageversion*” is used, all known translations should be listed in the LOM of every related Learning Object. To be able to identify the original version, one could make use of the proposed “*7.1.1 IsOriginal*” element.

Guideline:	List all known translations in “<i>hasalternativelanguageversion</i>”. Mark the original version(s) with “<i>IsOriginal</i>”
Applicable for:	Translation management

6.2 Language of a related learning objects

To get a list of all available languages for a given learning object, one can traverse all relations as shown in an example in chapter 7.

In order to be able to get this list without the need to traverse all corresponding LOM instances (which even might not exist), an optional attribute “7.2.3: Language” is introduced within the “7.2: Resource” field as one possible solution. This introduces a simple possibility to build up databases containing all relevant information about the availability of alternative language versions.

Guideline:	Use the optional entry “<i>Language</i>” in the relation field to state the language of the related learning object. Use this mechanism especially if you cannot or do not like to access the LOM instance of the referenced learning object.
Applicable for:	Alternative Version Query, Specific Language Version Query

If the introduction of the attribute “7.2.3: Language” is not possible (e.g. if the LOM model of the used system doesn’t allow such an addition) or not wanted, the language of the related learning object might even be stated in the description field of the relation entry.

Note that this leads to the problem of interpreting the content of the description field if you want to be able to evaluate this information within queries. However, the additional information about the language of a translation might even be useful for human interpretation, e.g. in a query result, so the statement of the translation language should be done in the description anyway. In order to be able to do search queries on this information, the ISO 639 should be used.

Guideline:	Always state the language of the related learning object within the description field of the relation. Use the ISO 639 language codes in addition to the colloquial language name if you want to be able to search on this information.
Applicable for:	All usages

Note that both methods stated in this section lead to redundant data, so be careful to have mechanisms of identifying changes in the list of available languages of a learning resource.

6.3 Additional contributors

In case of translations of Learning Objects there is a new contributor role, the translator of the Learning Object.

Therefore the value space of element “2.3.1 Role”, sub-element of “2.3 Contribute” is expanded by the entry “*translator*”:

Nr	Name	Value Space	Suggestions / Comments
2	LifeCycle	-	
2.3	Contribute	-	
2.3.1	Role	author publisher unknown initiator terminator validator editor graphical technical content technical educational script instructional subject matter expert <i>translator</i>	designer implementer provider validator validator writer designer Value Space should be extended in order to include the contributing role of the translator of a Learning Object
2.3.2	Entity	VCard	

Guideline:	Use the contribution role “<i>translator</i>” to explicitly refer to the translator of the Learning Object.
Applicable for:	Translation management

6.4 Identification of related learning objects

Users probably wish to get a list of available translations. One possible solution for this is the traversal of all related LOM instances. In chapter 7 an example for a traversal procedure is presented.

CWA NNNNN (or the Working Document Identifier Number)

In order for the traversal procedure to work, the identification of LOM instances is essential. For this purpose, the use of the “1.1 Identifier” element is strongly encouraged.

Note that this assumes that you have access to and/or can influence the identification mechanism of all involved learning objects or LOM instances. Since this is surely not always the case, you might consider to use the simplified method of listing the translations with their languages as shown in section 6.2.

Guideline:	Try to have a unique and clear identification mechanism for relating Learning Objects. The “1.1 Identifier” element should be used when referring to Learning Objects adhering to version 6.3 and above.
Applicable for:	All usages

However, it is not always possible to have this identification of the related LOM instance, this LOM instance might not even exist. In this case, the identification may be done within the description of the related learning object.

Guideline:	Give the identification of the related learning object within the description of the relation in case the related learning object does not have a LOM instance or the LOM instance has no unique Identifier.
Applicable for:	All usages

6.5 Quality and status of a translation

As stated above, the LOM of a translation should describe the translation, not the original Learning Object itself.

Therefore, the Attributes dealing with quality and status are bound to the translation process itself within the LOM of the alternative language version.

To express the current status of the translation, the “2.2 LifeCycle, Status” entry shall be used.

To express the evaluation of the translation quality, entry “2.3.1 LifeCycle.Contribute.Role” shall be used with the value “validator”.

Guideline:	Use the entries in “2 LifeCycle” to document the quality and status of a Learning Object translation.
Applicable for:	Translation management

7 Usage Examples

In the following section, we provide examples for the practical use of the recommended LOM relationship entries.

7.1 Learning Objects with multiple language entries

MetaTravel is a CD-ROM software production implementing a travel guide for several European cities in three different languages: English, French and Spanish. This CD-ROM constitutes a complex Learning Object that inherently includes versions of the same information in all three languages. The LOM instance of this Learning Object should contain, among others, the following meta information:

```
General.Language=en
```

```
General.Language=fr
```

```
General.Language=es
```

```
LifeCycle.Contribute.Role=author
```

```
LifeCycle.Contribute.Entity =
```

```
  BEGIN:VCARD
```

```
  VERSION:2.1
```

```
  N:Pujol;Manuel;
```

```
  FN:Manuel Pujol
```

```
  ORG:EDITORIAL VIAJAR S.A.
```

```
  EMAIL;PREF;INTERNET:mpujol@viajar.es
```

```
  REV:20020310T223846Z
```

```
  END:VCARD
```

```
LifeCycle.Contribute.Role=translator
```

```
LifeCycle.Contribute.Entity =
```

```
  BEGIN:VCARD
```

```
  ...
```

```
  END:VCARD
```

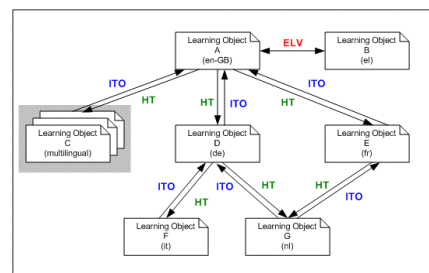
```
LifeCycle.Contribute.Role=translator
```

```
LifeCycle.Contribute.Entity =
```

```
  BEGIN:VCARD
```

```
  ...
```

```
  END:VCARD
```



7.2 Learning Objects without a LOM instance

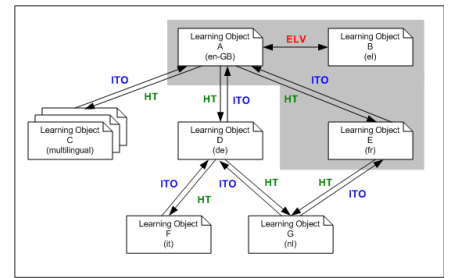
MetaNews is a Web magazine for metadata in education. The articles of the magazine are created and published both in English (fig. Learning Object A) and Greek (fig. Learning Object B)¹. The “Adopting LOM” article is translated and included in a French book (fig. Learning Object E). The following example demonstrates the one of the possible entries in the LOM data element “7 Relation” to link the several alternative language versions of the aforementioned article.

¹ Adaptation from example published in the electronic document ‘Dublin Core in RDF’ (<http://www.ukoln.ac.uk/metadata/resources/rdf/examples/2/>)

Relation element of the LOM of the English version

Relation.Kind=equivalentlanguageversion
 Relation.Resource.Identifier=
 ["http://www.metanews.be/vol12/ad-lom-de.html"](http://www.metanews.be/vol12/ad-lom-de.html)
 Relation.Resource.Description=
 "German version of the 'Adopting LOM' article"

Relation.Kind=hastranslation
 Relation.Resource.Identifier="ISBN960-352-097-6"
 Relation.Resource.Description="Greek printed version of the 'Adopting LOM' article"



7.3 Finding all language versions of a Learning Object

This example shows how to identify all translations of a given Learning Object by traversing all LOM relationship types stated by this CWA. Let's assume the Learning Object structure presented in Figure 1 of the current document (see adjacent thumbnail).

Let's suppose we have the LOM of a Learning Object G. We want to locate all the alternative language versions. We start the traversal at Object G and add all reachable Learning Objects, until no unchecked LOM instances exist:

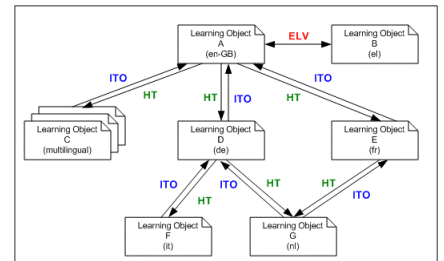


Table 1. Traversing all language versions of a LO

SOURCE LOM	RELATION	Derived alternative version	Alternative Language versions	Unchecked LOM instances
	-	-	-	G
G	G.ITO.D	D	D	D
G	G.ITO.E	E	D,E	D,E
D	D.HT.F	F	D,E,F	E,F
D	D.HT.G	G	D,E,F	E,F
E	E.HT.G	G	D,E,F	F
E	E.ITO.A	A	D,E,F,A	F,A
F	F.ITO.D	D	D,E,F,A	A
A	A.HT.C	C	D,E,F,A,C	C
A	A.HT.D	D	D,E,F,A,C	C
A	A.HT.E	E	D,E,F,A,C	C
A	A.ELV.B	B	D,E,F,A,C,B	C,B
C	C.ITO.A	A	D,E,F,A,C,B	B
B	B.ELV.A	A	D,E,F,A,C,B	-

7.4 Simple existence of Alternative Language Versions

Let's assume the Learning Object sub-structure of Figure 1 of the current document (see adjacent thumbnail), indicating the existence of an original language version A of a learning resource and its relationship with the alternative language versions D, F and G. In case the translation process is not to our interest, but we do need to have an overview of all the existing translations of D, for instance, the Relation element of D's LOM should contain:

Relation element of the LOM of the learning resource D

```
Relation.Kind=hasalternativelanguageversion
Relation.Kind.IsOriginal=true
Relation.Resource.Identifier="http://www.a-site.be/a.html"
```

```
Relation.Kind=hasalternativelanguageversion
Relation.Kind.IsOriginal=false
Relation.Resource.Identifier="http://www.f-site.be/f.html"
```

```
Relation.Kind=hasalternativelanguageversion
Relation.Kind.IsOriginal=true
Relation.Resource.Identifier="http://www.g-site.be/g.html"
```

