

# Using the TEI framework as a possible serialization for LMF

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# Using the TEI framework as a possible serialization for LMF

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# Executive summary

- Issue: identifying an “appropriate” serialization for LMF
  - Serialization: mapping a lexical model onto a concrete (computer) representation (field based, XML, etc.)
  - Wide consensus, maintenance, flexibility, cohesion with other standardization activities
- The TEI is an ideal basis for defining standardized XML formats for lexical data
  - TEI as an infrastructure
    - Customization facilities: ODD, classes, pointing mechanisms, etc.
  - TEI as a reference vocabulary
    - Print dictionary chapter (PD)
  - TEI as an application of LMF
- Workplan proposal
  - Defining the ideal LMF compliant subset of the TEI PD chapter
  - Suggesting extensions to the PD chapter
- Convergence...
  - Contribution to making ISO and TEI work closer together

# The TEI at a glance

- Started in 1987
- Organized as a consortium: 5 hosts, board, council
- Edition P5 of the guidelines: more than 500 elements covering various text genres and structures
  - Genericity: header, text structure, pointing mechanisms, paragraph level elements, surface entities
  - Precise and flexible documentation
  - Maintenance: 2 releases per year
- Wide community of users: default format for most text-based projects worldwide
  - Cf. papers from Przepiorkowski, or Erjavec at LREC
- And yes, it is XML based... e.g. preconfigured in Oxygen

# Intermezzo — an XML tutorial

- XML is about awful angle brackets (serialization)

```
<gramGrp>  
<gen>f</gen>  
<num>p</num>  
</gramGrp>
```

- XML is about beautiful trees (model)
- Issues
  - Specifying structures
  - Providing semantics

# Basic concepts of the TEI technical platforms

- A specification language ODD (One Document Does it all)
  - Literate programming (Knuth)
  - Generation of both schemas and documentation
    - DTD, RelaxNG, W3C scemas
    - HTML, pdf, ePub, docx
  - Provides extended customization facilities
  - `<equiv>`
    - Natural link with ISOCat
- Modules
  - Each schema specification is a combination of internal or external modules
    - E.g. ISO-TEI Feature-Structure module
- Classes (sharedbehavioursorsemanantics)
  - Model classes
  - Attribute classes

# From ODD to documentation

<b>&lt;gen&gt;</b> (gender) identifies the morphological gender of a lexical item, as given in the dictionary. <a href="#">9.3.1 Information on Written and Spoken Forms</a>	
<b>Module</b>	dictionaries — <a href="#">9 Dictionaries</a>
<b>Attributes</b>	<a href="#">att.lexicographic</a> (@expand, @norm, @split, @value, @orig, @location, @mergedIn, @opt)
<b>Used by</b>	<a href="#">model.entryPart</a> <a href="#">model.morphLike</a>
<b>Declaration</b>	<div style="text-align: right;"><a href="#">Compact to XML format</a></div> <pre>element gen {   att.global.attributes,   att.lexicographic.attributes,   macro.paraContent }</pre>
<b>Example</b>	<pre>&lt;entry&gt;   &lt;form&gt;     &lt;orth&gt;pamplemousse&lt;/orth&gt;   &lt;/form&gt;   &lt;gramGrp&gt;     &lt;pos&gt;noun&lt;/pos&gt;     &lt;gen&gt;masculine&lt;/gen&gt;   &lt;/gramGrp&gt; &lt;/entry&gt;</pre>

# TEI and “dictionaries”

- The TEI Print Dictionary (PD) chapter
  - Initially designed by N. Ide and J. Veronis
  - Accounts for both presentational and editorial (“content”) issues
    - Cf. <entry>, <entryFree>, ... and <dictScrap>
  - Based on a hierarchical abstract model (cristals)
    - <form>: for characterising the orthographic or phonetic form of the word
      - <orth>, <pron>, etc.
    - <gramGrp>: grammatical features
      - May characterize an entry, a specific form or a specific sense
      - <pos>, <gen>, generic <gram> feature
    - <sense>: iterative and recursive
      - May contains definitions, examples, etymological information, translations, etc.
- Main characteristic (drawback?): +very+ flexible



# Examples

```
<entry>
<form>一乘顯性教</form>
<sense>One of the five divisions made by 圭峰 Guifeng of the Huayan 華嚴 or Avataṃsaka
School; v. 五教.</sense>
</entry>
```

```
<entry>
<form>眾生不可思議</form>
<sense>
<usg type="dom">術語</usg>
<def>四事不可思議之一。見不可思議條。</def>
<xr>不可思議</xr>
</sense>
</entry>
```

# Examples – cont.

```
<entry>
<form type="lemma">
<orth>chat</orth>
</form>
<gramGrp>
<pos>noun</pos>
<gen>masculine</gen>
</gramGrp>
<form type="inflected">
<orth>chat</orth>
<gramGrp>
<number>singular</number>
</gramGrp>
</form>
<form type="inflected">
<orth>chats</orth>
<gramGrp>
<number>plural</number>
</gramGrp>
</form>
</entry>
```

# Customizing an entry

```
<entry>
<form>
<orth>table</orth>
</form>
<gramGrp>
<pos>n.</pos>
<gen>f.</gen>
</gramGrp>
<def>Pièce de mobilier...</def>
<cit>
<quote>Une table de cuisine</quote>
</cit>
</entry>
```

Selecting content  
e.g.: <pos>, <gen>, <num>, <tense>

Constraining content  
e.g.: f., f, fem, féminin, feminine,...

Adding content  
e.g.: <transitivity>

# Illustrating classes: tei.gramInfo

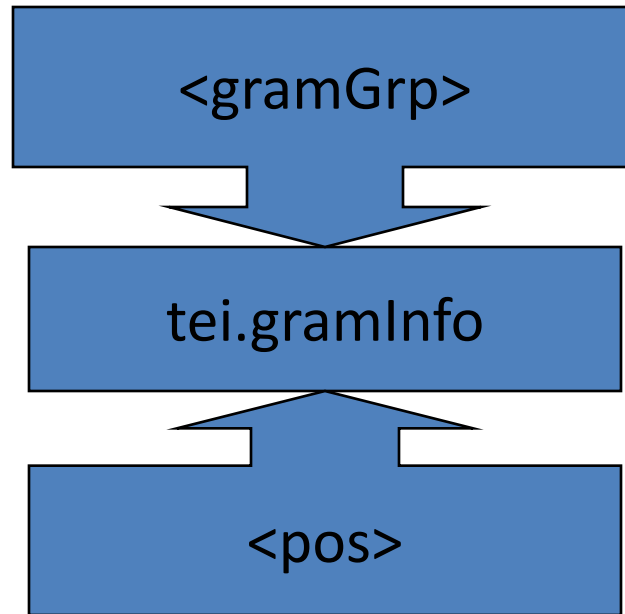
- Grammatical information in a dictionary entry

- E.g.:

```
<entry>  
<form>  
<orth>luire</orth>  
</form>  
<gramGrp>  
<pos>verb</pos>  
<subc>intransitive</subc>  
</gramGrp>  
</entry>
```

- Rather homogeneous set of elements
      - <pos>, <gen>, <number>, <case>, etc.
    - May also appear in <form>

# Overall picture



# Declaring the class: `tei.gramInfo`

```
<classSpec xmlns="http://www.tei-c.org/ns/1.0" module="dictionaries-decl"
  id="GRAMINFO" type="model" ident="tei.gramInfo">
  <gloss>grammatical information</gloss>
  <desc>groups those elements allowed within a <gi>gramGrp</gi> element in a
    dictionary.</desc>
</classSpec>
```

# <pos> belongs to tei.gramInfo

```
<elementSpec module="dictionaries" id="POS" ident="pos">  
<gloss>part of speech</gloss>  
<desc>indicates the part of speech assigned to a dictionary headword (noun, verb,  
    adjective, etc.)</desc>  
<classes>  
<memberOf key="tei.dictionaryParts"/>  
<memberOf key="tei.gramInfo"/>  
<memberOf key="tei.dictionaries"/>  
</classes>  
<content> ... </content>  
<exemplum> ... </exemplum>  
</elementSpec>
```

# Content model for <gramGrp>

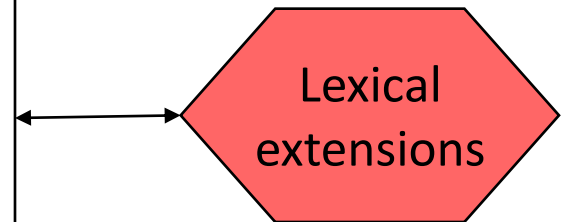
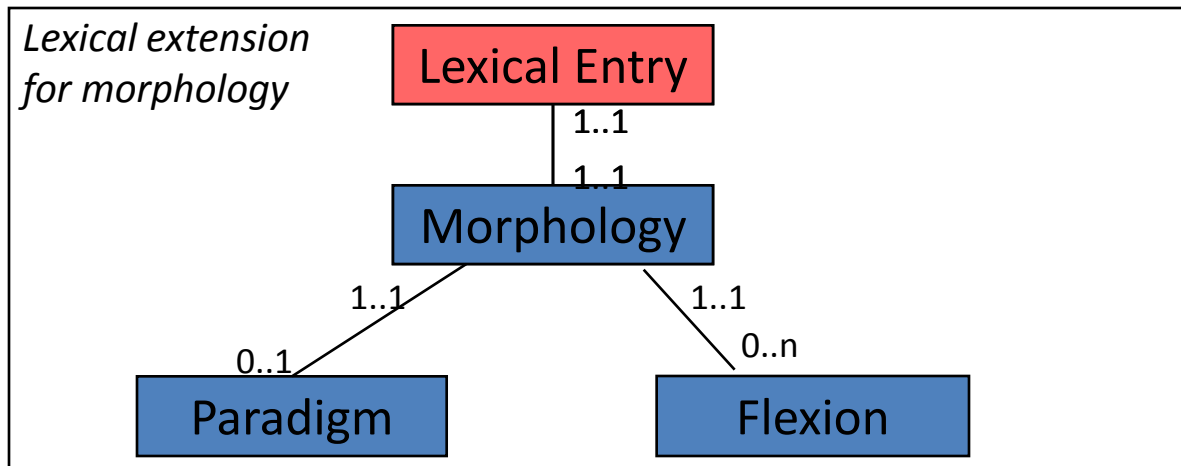
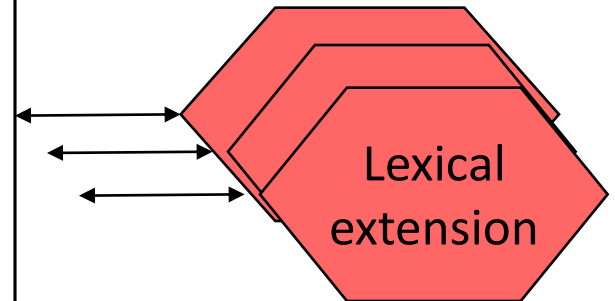
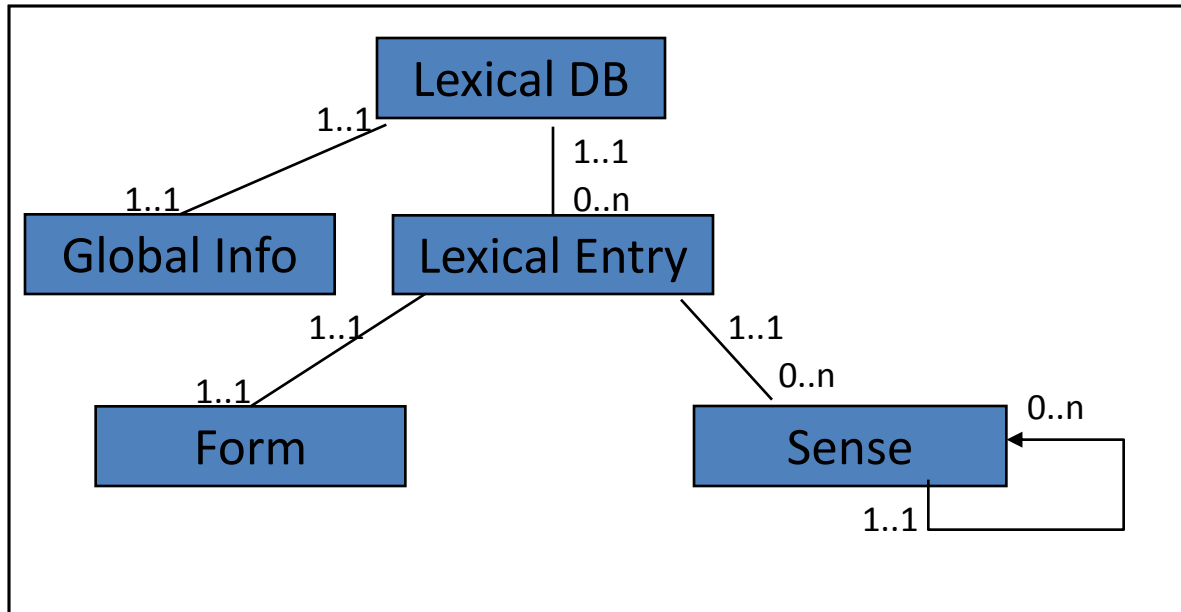
```
<elementSpec module="dictionaries" id="GRAMGRP" ident="gramGrp">
<gloss>grammatical information group</gloss>
<content>
<rng:zeroOrMore
      xmlns:rng="http://relaxng.org/ns/structure/1.0">
<rng:choice>
<rng:text/>
<rng:ref name="tei.phrase"/>
<rng:ref name="tei.inter"/>
<rng:ref name="tei.gramInfo"/>
<rng:ref name="tei.Incl"/>
</rng:choice>
</rng:zeroOrMore>
</content>
...
</elementSpec>
```



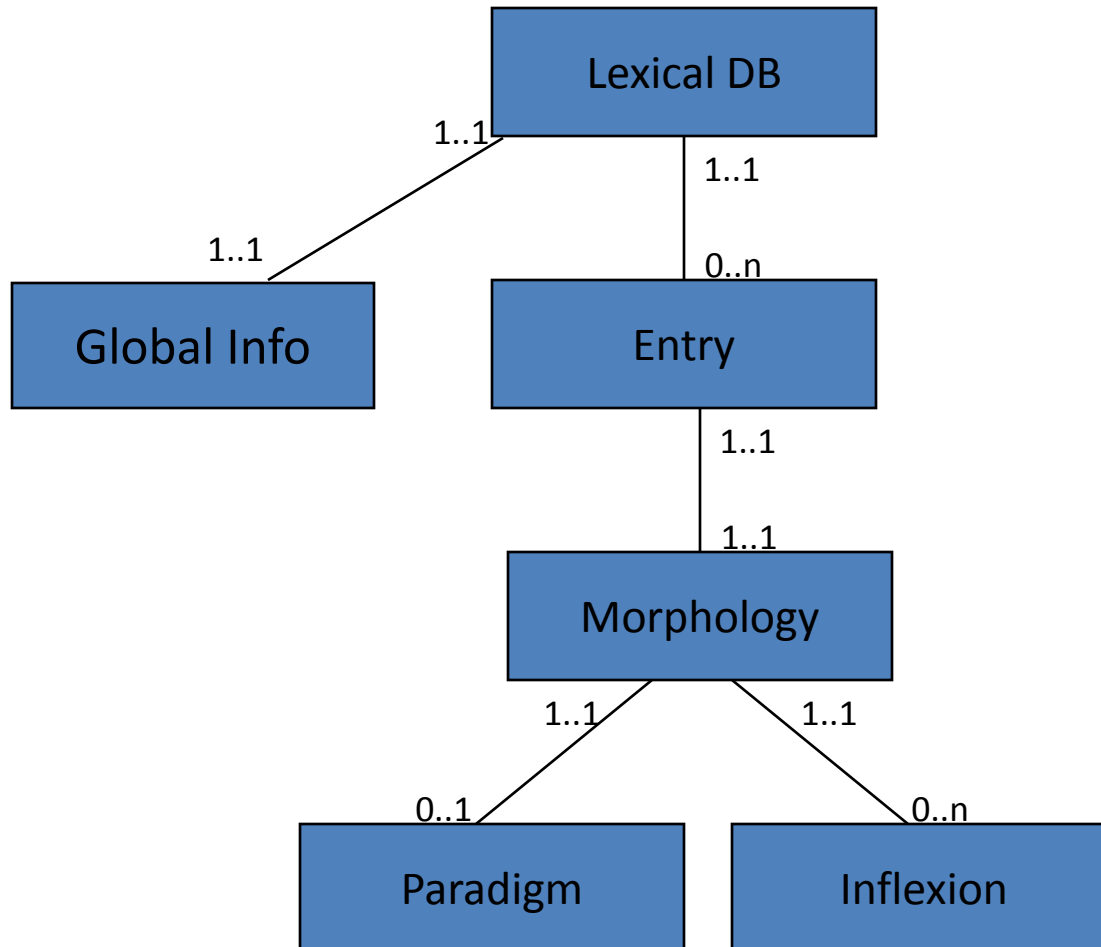
# LMF at a glance

- LMF – Lexical Markup Framework
  - ISO standard 24613 (published Oct. 2008)
  - Edited within ISO committee TC 37/SC 4
- Technical content
  - Focus on provided a core meta-model with extensions
  - Potentially agnostic with regards serialisation
    - Isomorphism => interoperability
  - Default syntax to exemplify its possible use, room for improvement...
- Can the TEI be seen as a conformant implementation of LMF?

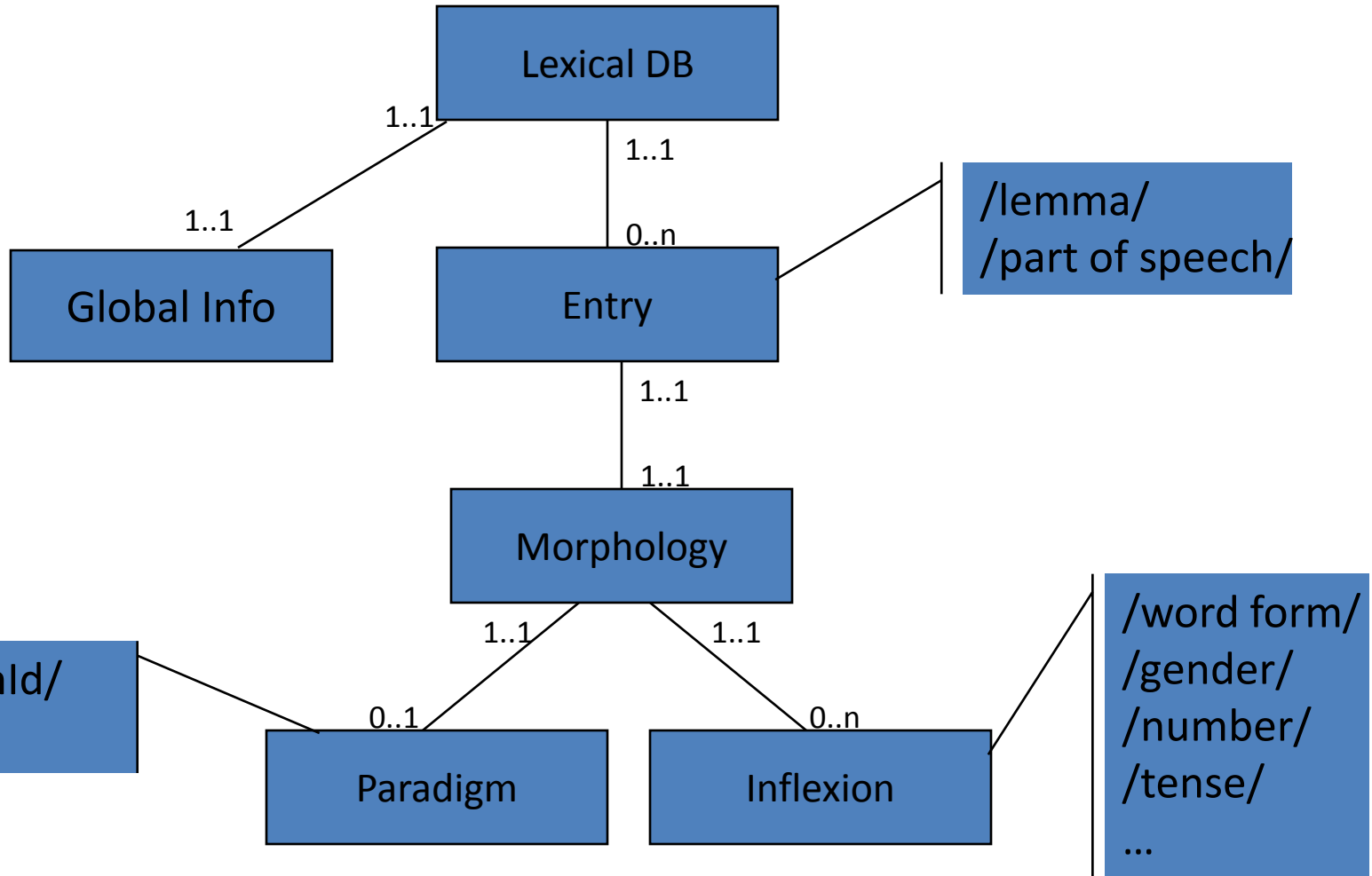
# LMF architecture — playing Lego



# Example: designing a full-form lexicon



# Decorating the model



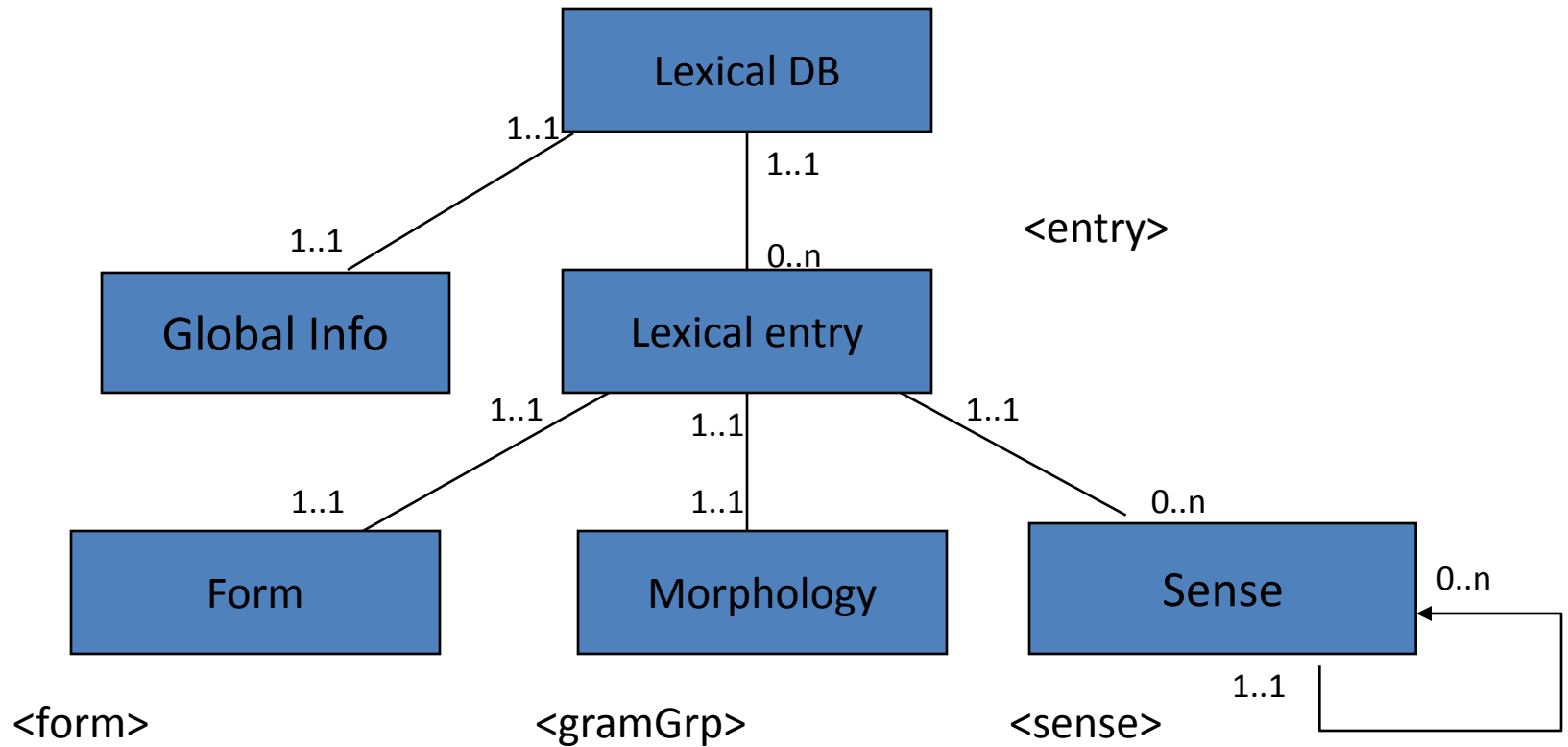
# Why is the TEI a good idea for serialising LMF?

- Basic structure already defined
- Provision of additional tags
  - Surface annotation (e.g. names, dates, abbreviations, alternatives)
  - Cf<equiv> equivalences to ISOCat when needed
- Integration of lexical data in a textual macro-structure
  - Creating an edited version of a lexica
  - Grammar books, teaching material, scientific papers
- Interoperability with other lexical sources
  - Community of users: sharing a common culture of TEI tags rather than constantly worrying about mappings
  - Sharing tools: e.g. stylesheets, editors, etc. (cf. Roma)
  - Note: continuity between dictionary and lexical sources

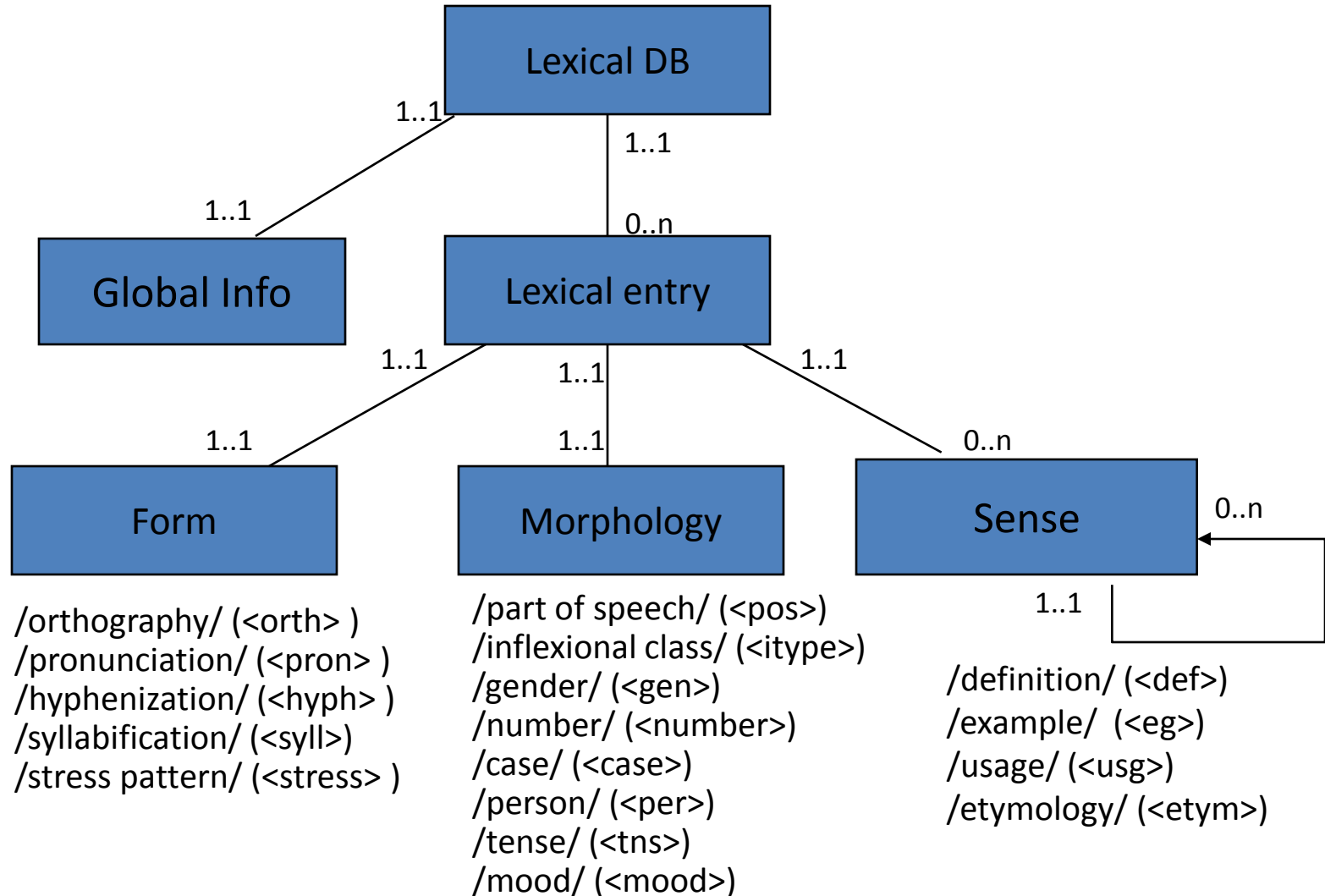
# A typical entry

```
<entry>
<form>
<orth>demigod</orth>
<pron>...</pron>
</form>
<gramGrp
<pos>n</pos>
</gramGrp>
<sense n='1'>
<sense n='a'>
<def>a being who is part mortal, part god</def>
</sense>
<sense n='b'>
<def>a lesser deity</def>
</sense>
</sense>
<sense n='2'>
<def>a godlike person</def>
</sense>
</entry>
```

# Identifying the meta-model components



# Data categories





# Customizing the TEI lexical model

- Constraining the TEI model
  - Sub-setting the TEI default dictionary module
  - Providing additional rules (XSLT, Schematron)
  - Constraining possible values
- Complementing the TEI model
  - Defining additional data categories
  - Defining missing LMF extensions as TEI components
    - Make use of the class mechanisms
    - A natural implementation of the LMF extension mechanisms

# Towards a joint ISO-TEI activity

- Contributing to convergence, with a pragmatic perspective
- Benefiting from advantages of both sides
  - TEI reactivity and community support
  - ISO stability and international validation
- LMF serialization seen as
  - A subset of the TEI when equivalent construct exist
  - An extension of the TEI for missing constructs (e.g. syntax)
- Some concrete work on the table...
  - Aside activities: specifying LL-LIF in ODD
- Reference
  - L. Romary, “Standardization of the formal representation of lexical information for NLP”
  - <http://hal.archives-ouvertes.fr/hal-00436328/fr/>