
# When Linked Open Data Speak Latin

## The LiLa Knowledge Base of Interoperable Linguistic Resources for Latin

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# Overview



## Introduction and fundamentals

- LiLa: mission and architecture
- The LiLa Lemma Bank

## LiLa now! lexica and corpora

- Lexical Resources
- Textual Resources
- Text Linker
- To sum up

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# Research question
## State of affairs



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Scattered and unconnected

# ERC Consolidator Grant 2018-2023

A collection of multifarious, interoperable linguistic resources described with the same vocabulary for knowledge description (by using common data categories and ontologies)

## Interlinking as a Form of Interaction

CLARIN
Common Language Resources and Technology Infrastructure

**Infra**structure

LiLa
Linking Latin

**Inter**operability

# The Linked Data Principles

…just to be FAIR

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- Use web standards to represent/query (meta)data, such as RDF and SPARQL

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- Use HTTP URIs to allow people (and machines) to look up things
- Use web standards to represent/query (meta)data, such as RDF and SPARQL
- Include links to other URIs

# Benefits of Applying LD to Linguistic Resources

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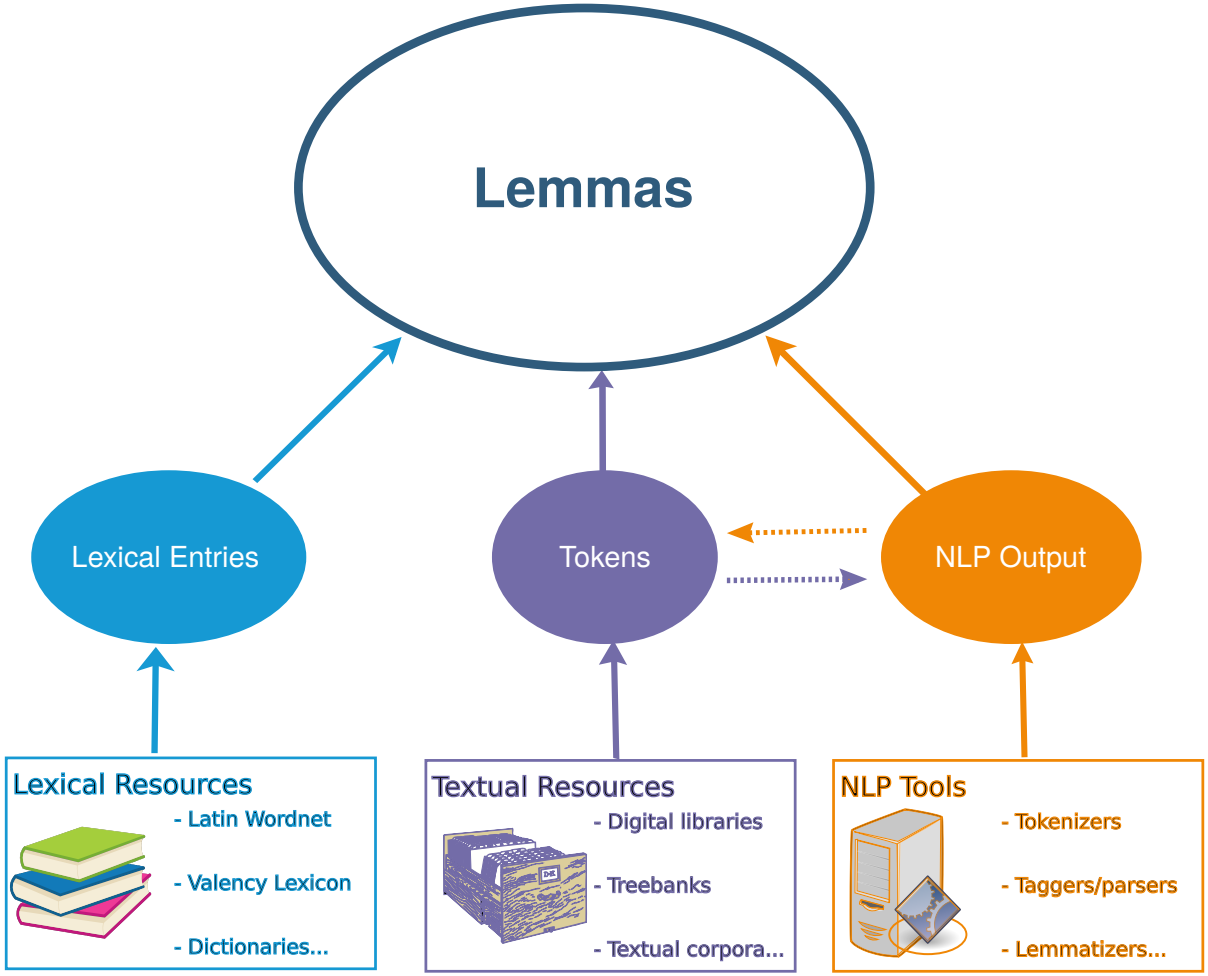
- Federation: to combine information from physically separated repositories
- Dynamicity: to provide access to the most recent version of a resource
- Ecosystem: maintained by a large and active community with common tools and practices

# LiLa Knowledge Base

**Lexically-based** architecture and (meta)data sources





# LiLa: Structure

## LiLa as mere reflection



**LiLa reflects the annotation granularity of the resources it connects**

No data enrichment or further analysis is performed
…but we can help you to enrich your (meta)data

# LiLa: Requirements

## Connecting resources in the Knowledge Base



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To enter the LiLa Knowledge Base, a textual/lexical resource must be:

- Lemmatised
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- Online!

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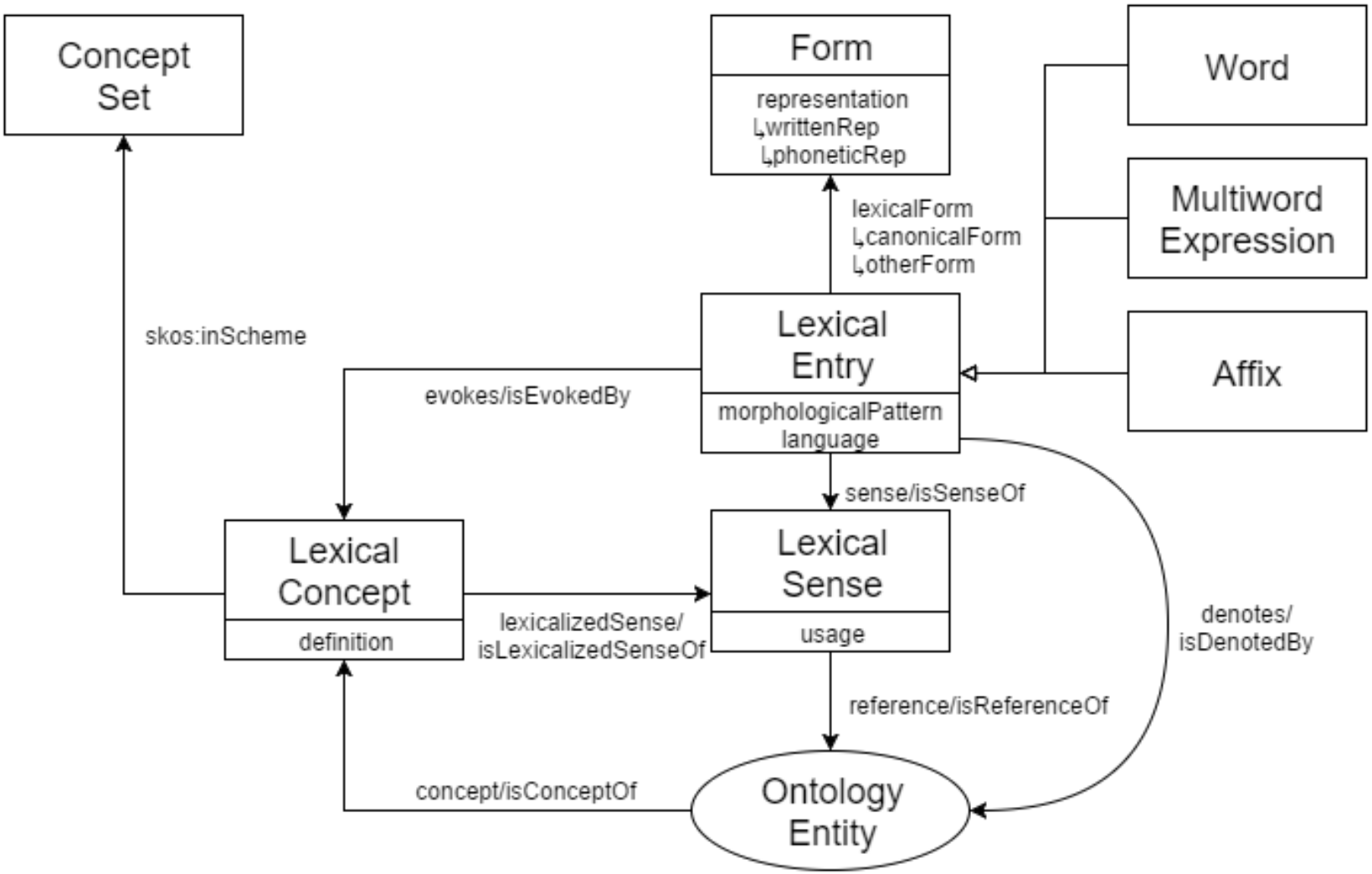
# LiLa and Ontolex Lemon

A *de facto* W3C standard for publishing lexical data as LLOD





# The Lemma Bank

The core of LiLa. Source: LEMLAT (extended)



Lemma *admiror* ‘to admire, to respect’

`https://lila-erc.eu/data/id/lemma/87541`

# Derivational Morphology

Source: *Word Formation Latin* (CIRCSE Research Centre)



- WFL: directed tree-graphs indicating derivational path of each lemma (procedural)
- New Approach: Construction Morphology (declarative), words analysed in their internal structure
- WFL in LiLa:
  - Three classes of objects:
    1. Lemma
    2. Prefix and Suffix
    3. Base (connectors between lemmas of the same WF family)
  - Connected by three relationships:
    1. hasPrefix
    2. hasSuffix
    3. hasBase

# Derivational Morphology

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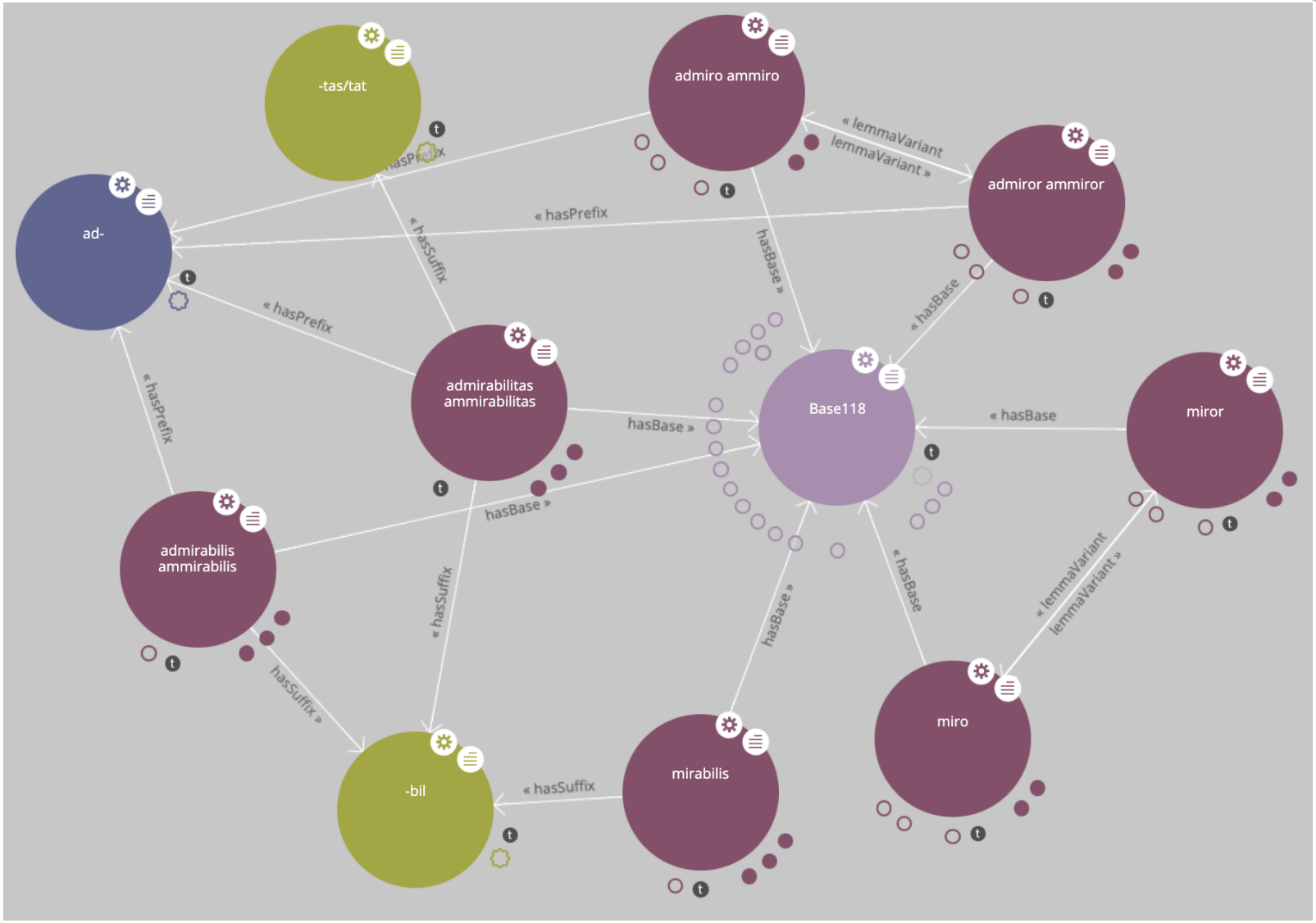

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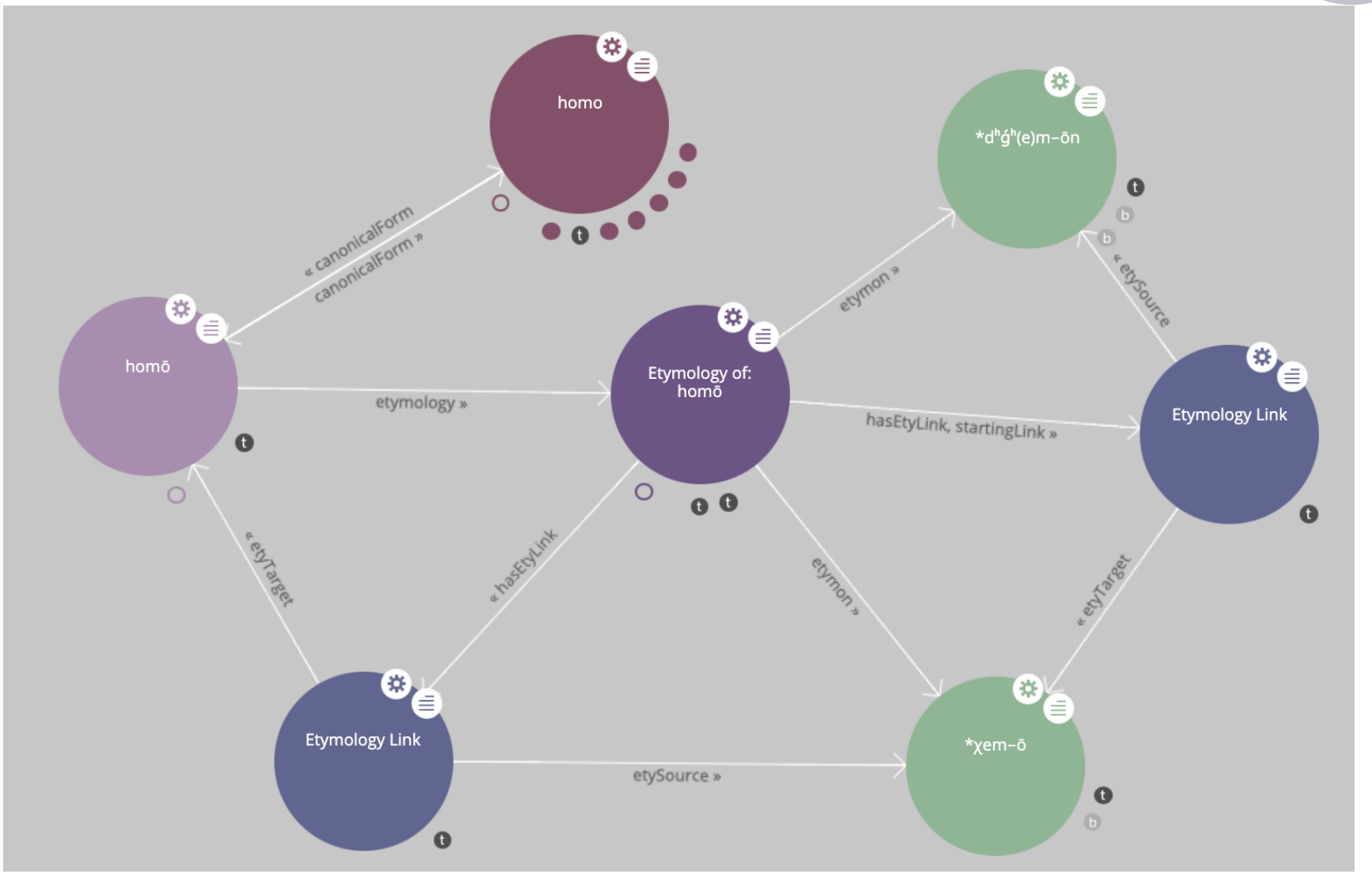
# Etymology

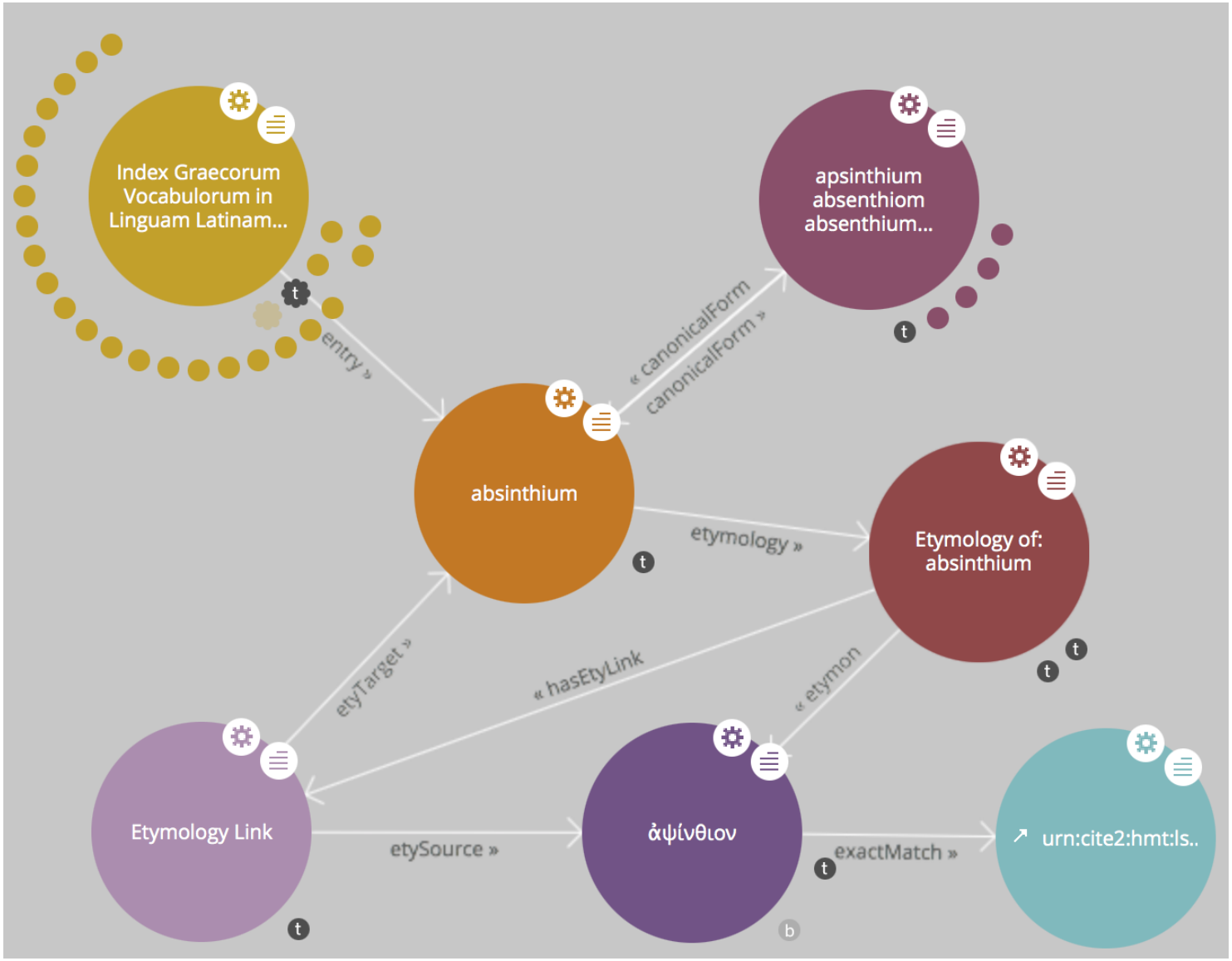
Source: *Etymological dictionary of Latin and the other Italic Languages* (De Vaan, 2008)





# Etymology

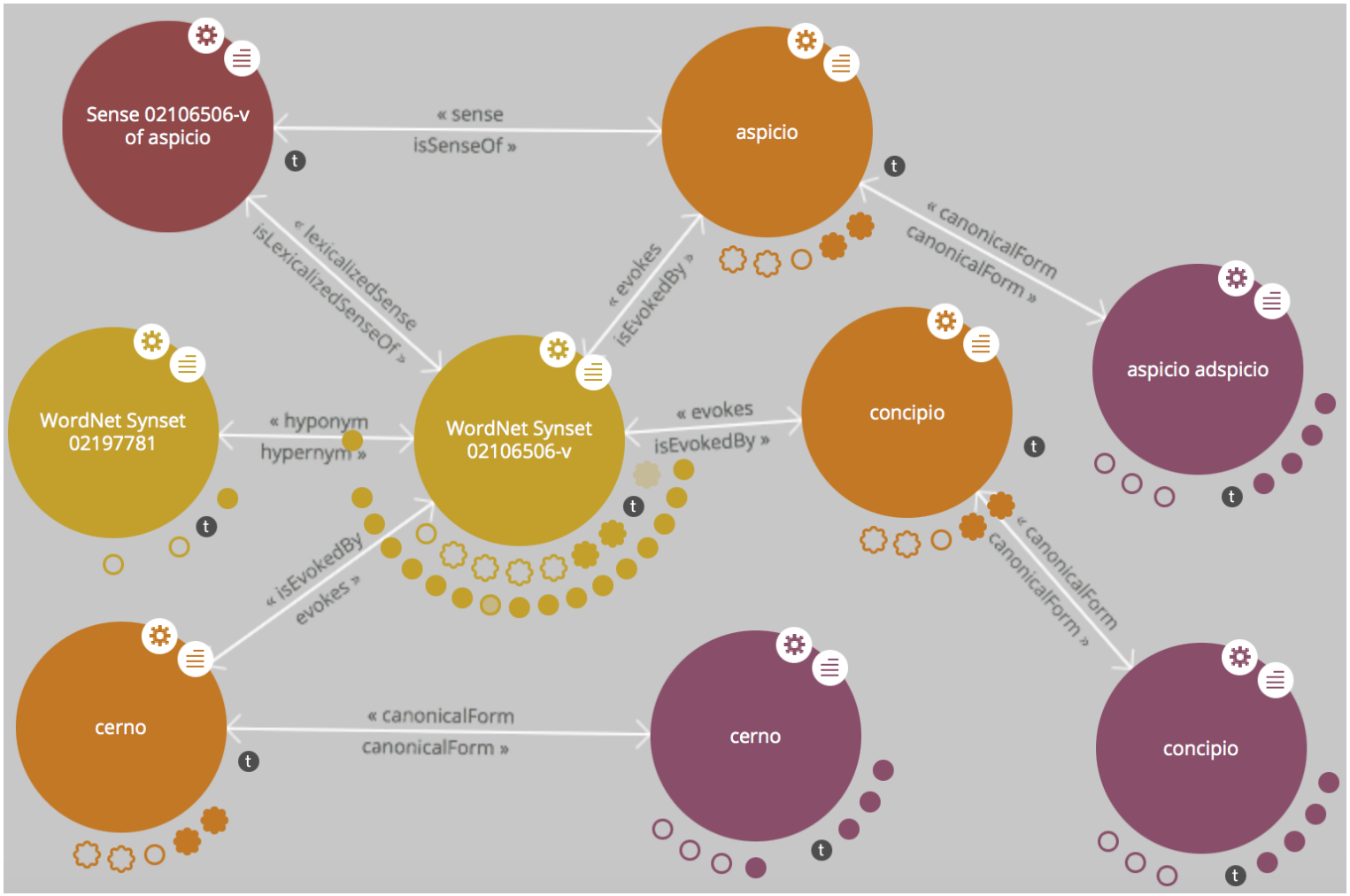
Source: *Index Graecorum Vocabulorum in Linguam Latinam* (Saalfeld, 1874)



# Latin WordNet

## Lexical Entries, Senses and Concepts

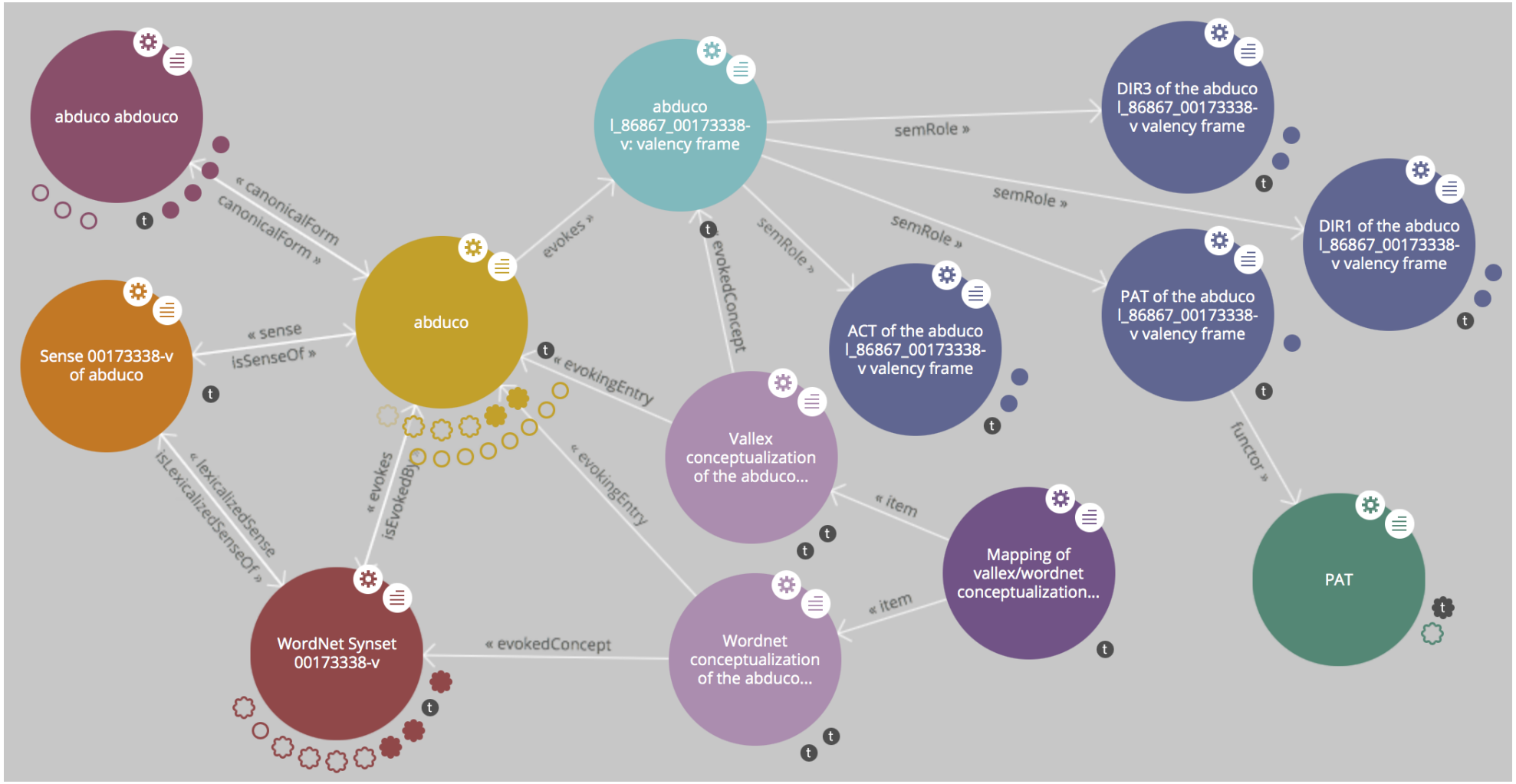




# Latin WordNet and Latin VALLEX

## Mapping Senses and Frames





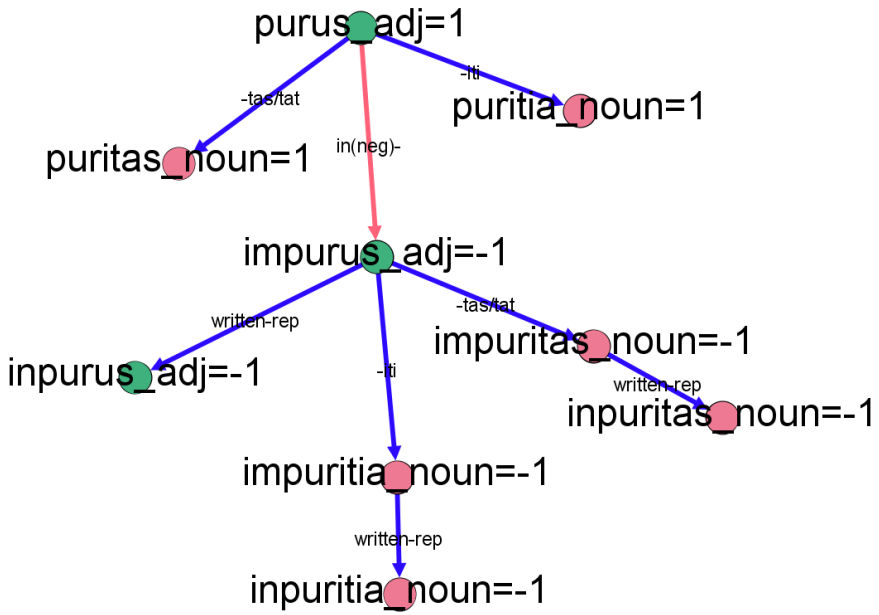
# Polarity

Source: *Latin Affectus* (CIRCSE Research Centre)



List of 2,437 nouns and adjectives associated to their **out-of-context sentiment score**: from -1 (very negative, e.g. *abominatio*) to +1 (very positive, e.g. *amor*)

- **Gold Standard**: manually created by 2 Latin language and culture experts + 1 supervisor
- **Silver Standard**: automatically created by deriving new entries from the Gold Standard



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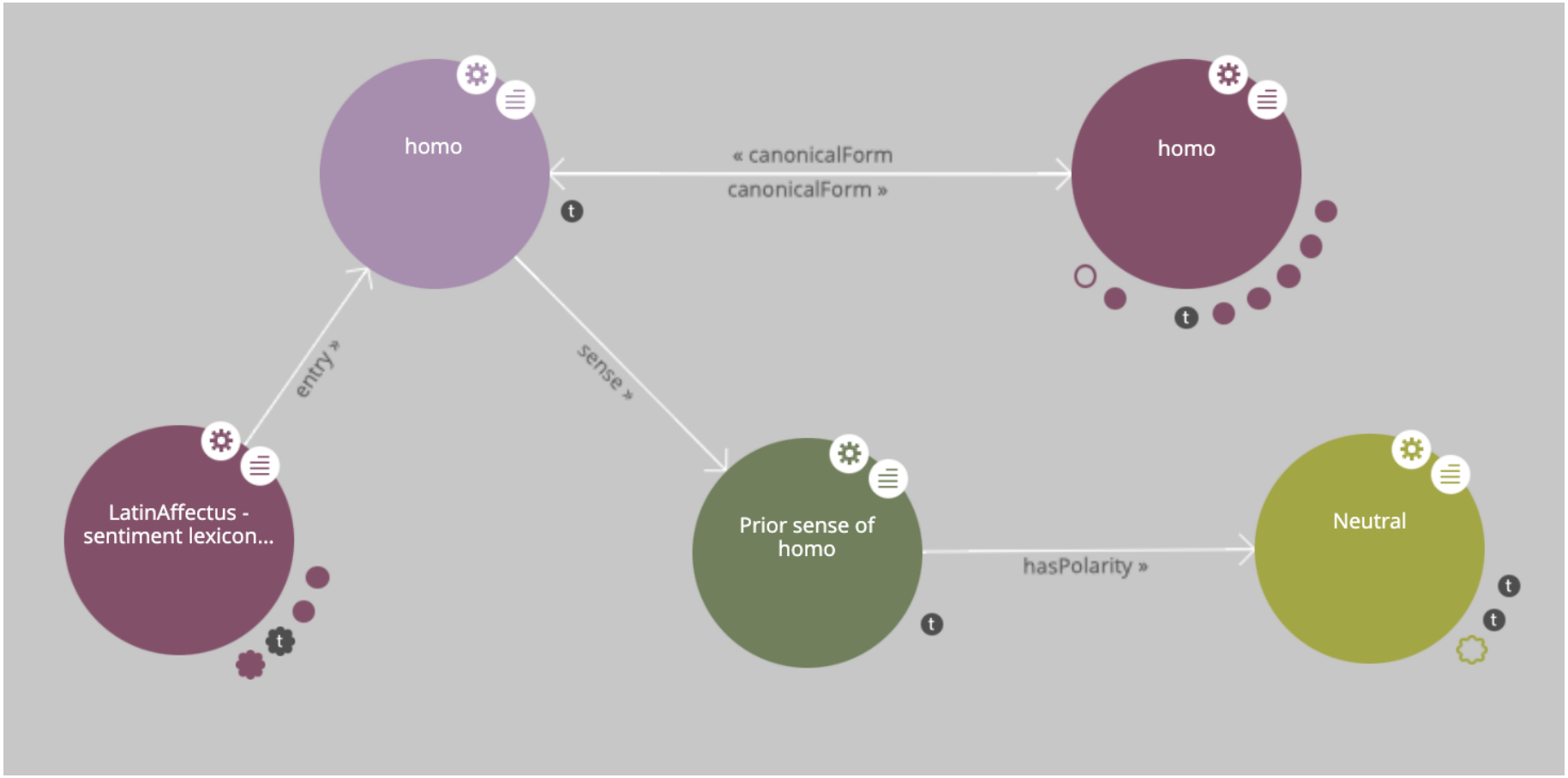
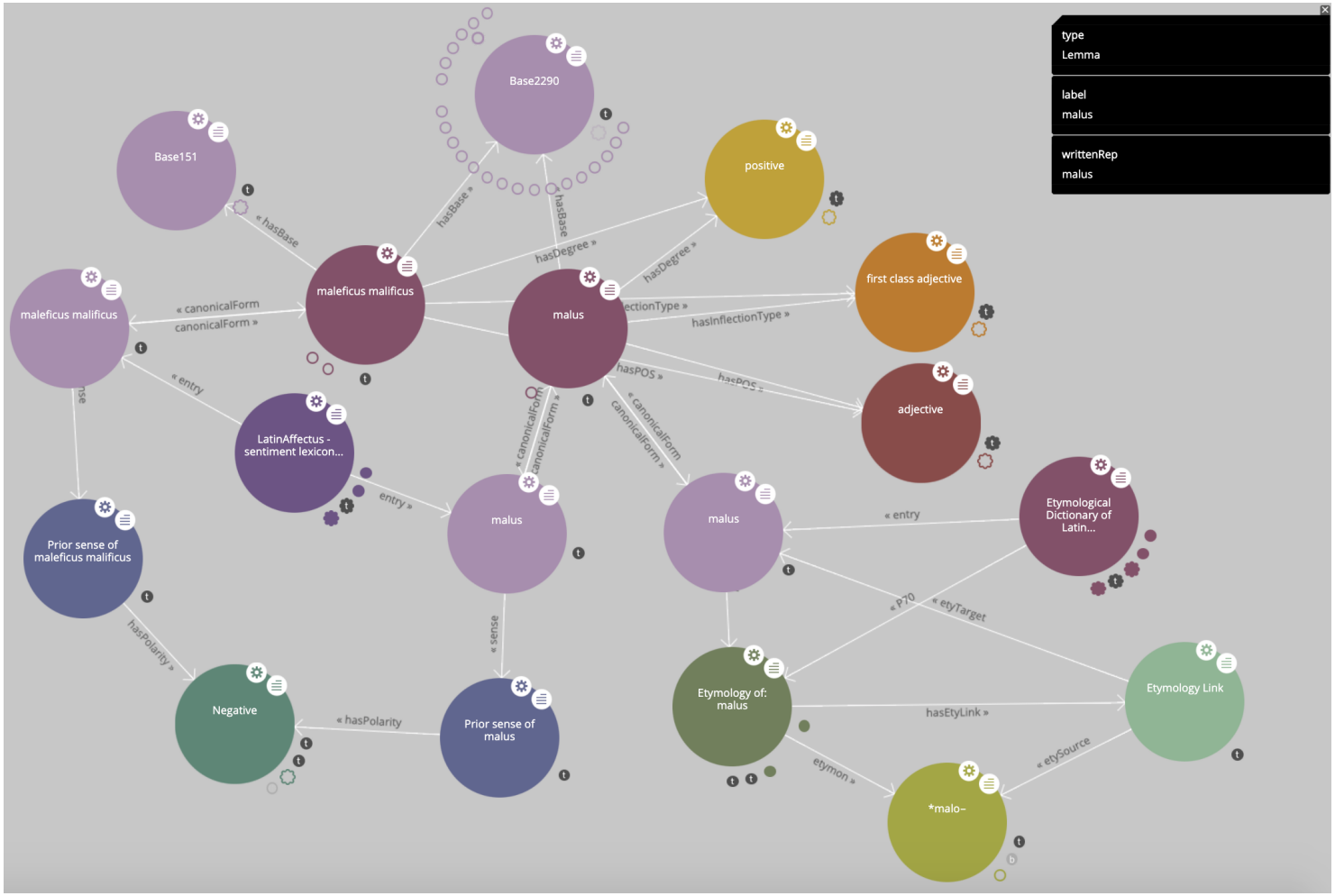


# LiLa: Structure. All together now!

## Lemma Bank, Derivational Morphology, Etymology and Polarity





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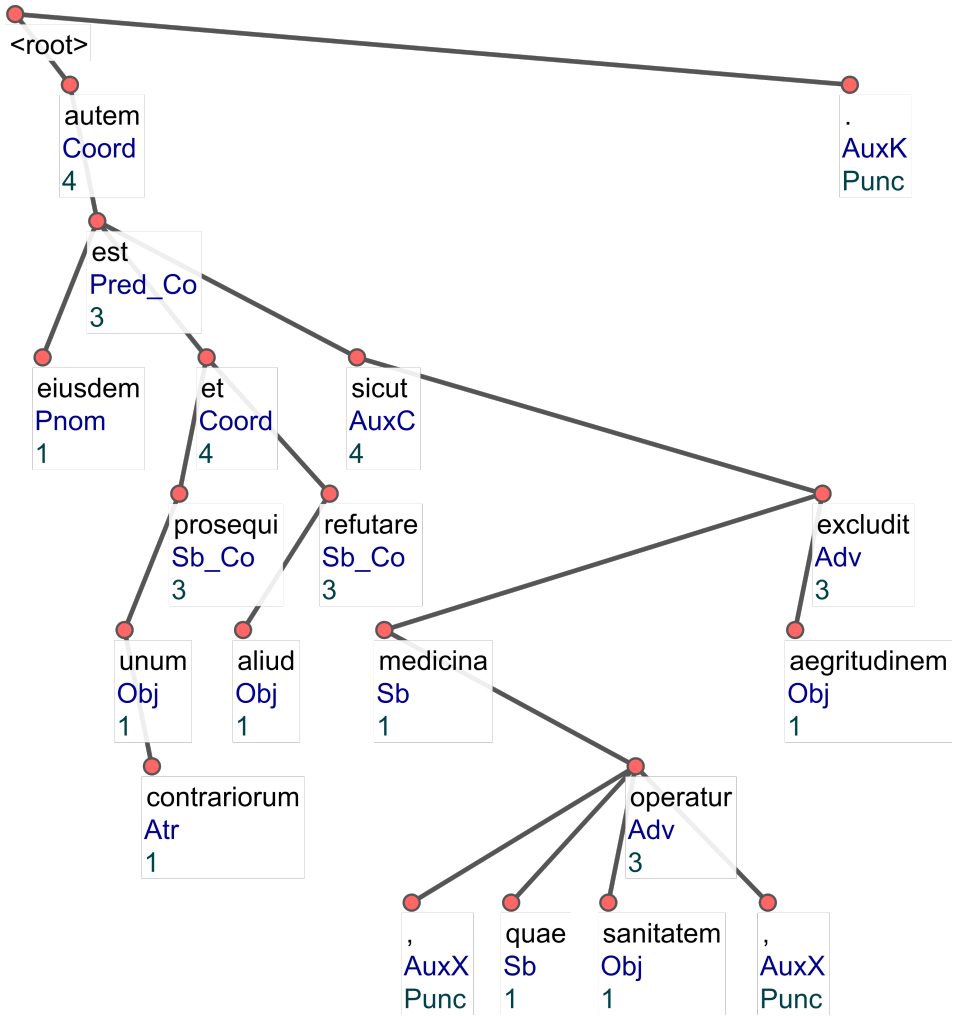
# (Annotated) Corpora in LiLa

Source: The *Index Thomisticus* Treebank (CIRCSE Research Centre): Dependency trees



***eiusdem*** *autem* ***est*** *unum contrariorum prosequi et aliud refutare sicut medicina , quae sanitatem operatur , aegritudinem excludit .* (IT-TB: SCG, lib. 1, cap. 1, n. 6)

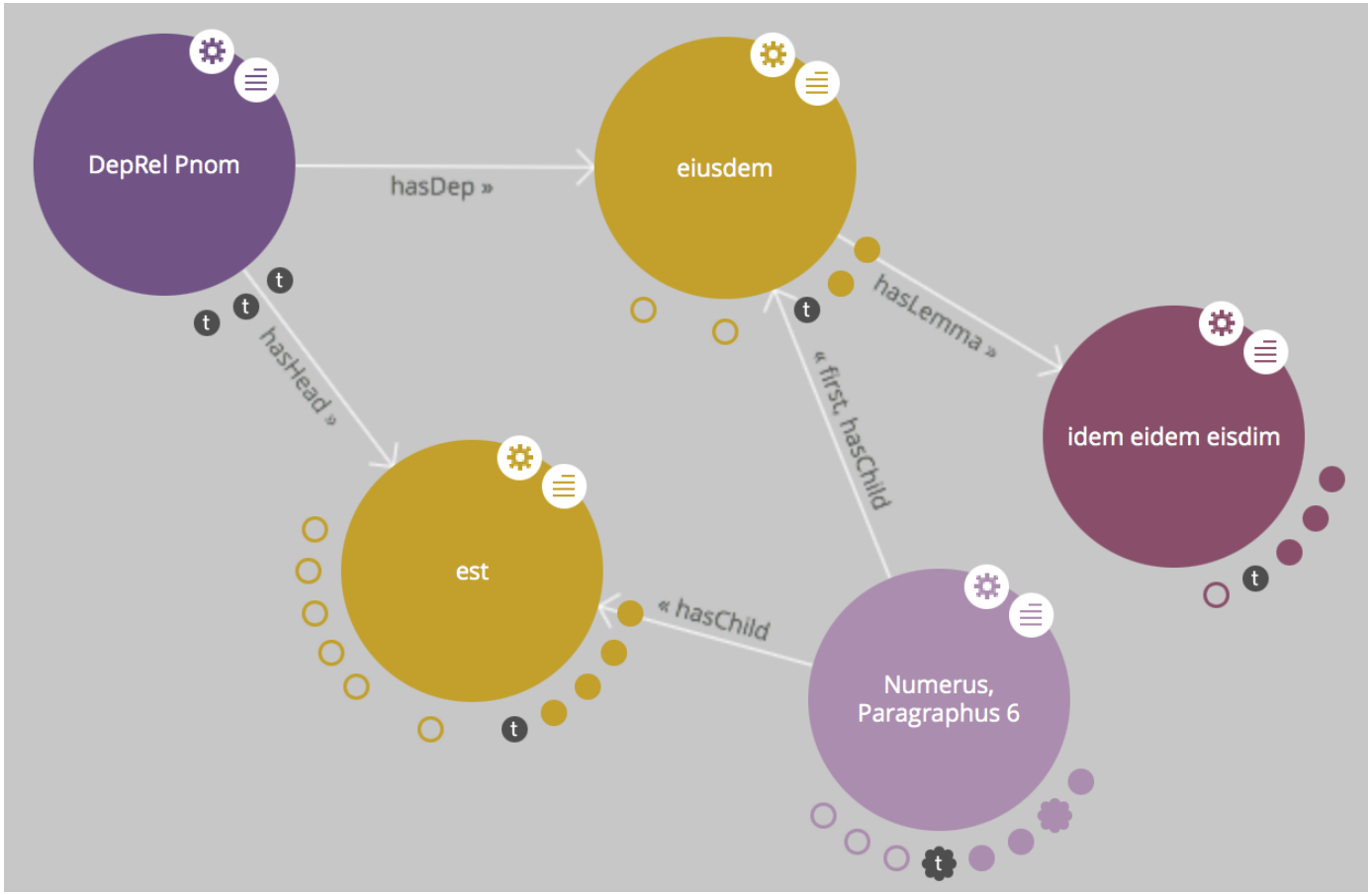
*Now* ***it belongs to the same thing*** *to pursue one contrary and to remove the other: thus medicine, which effects health, removes sickness.* (Trans. Laurence Shapcote)



# Texts, tokens, relations and lemmas

## Phenomena and noumena





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# TextLinker
## Welcome screen




Figure: LiLa's Text Linker

# TextLinker
## Processed output



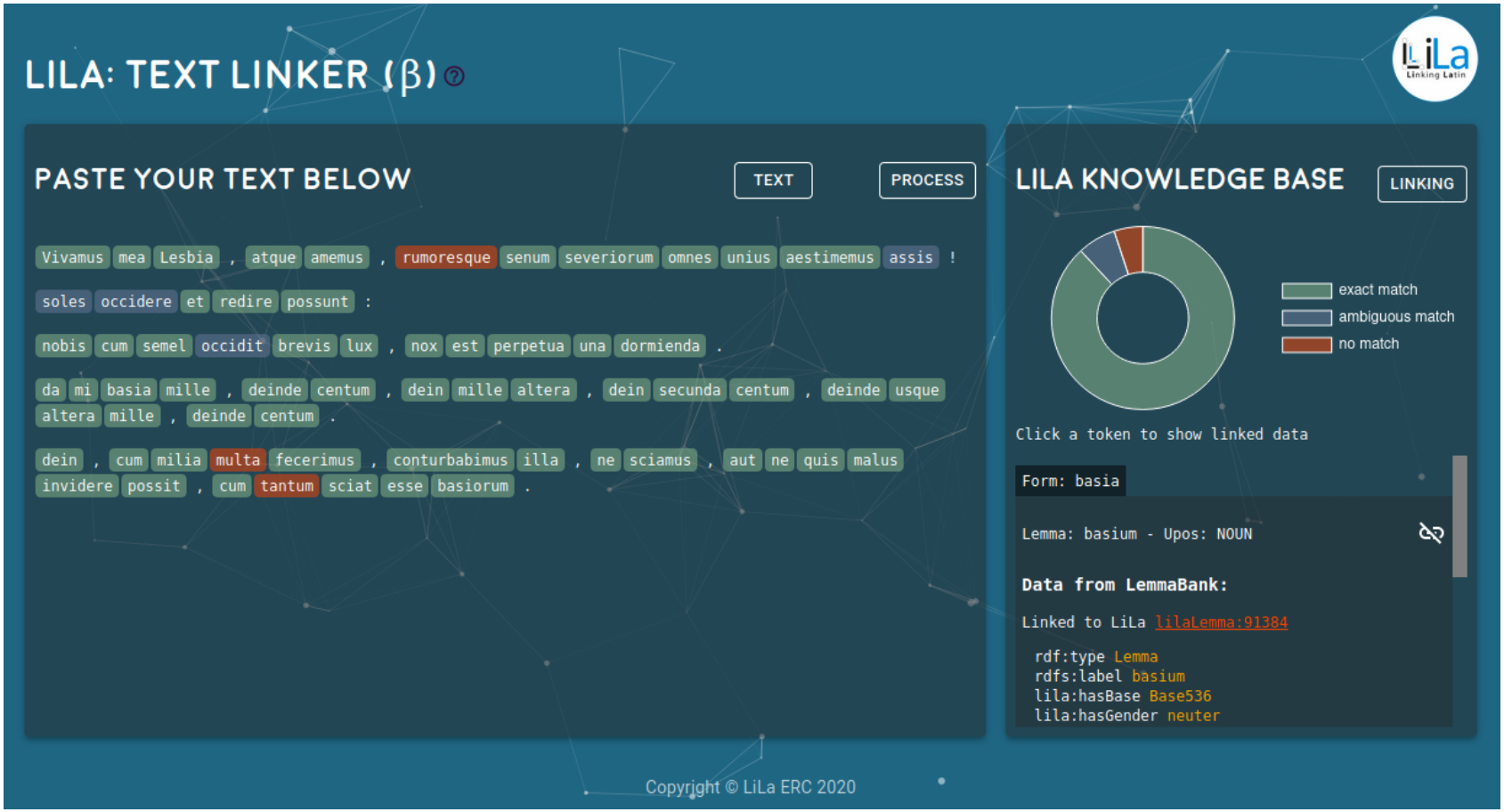


Figure: Text processed against the LiLa Knowledge Base

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# LiLa: Overview

Resources connected and upcoming connections

- **Corpora**
  - [x] Index Thomisticus Treebank (*Summa contra Gentiles*): ca. 450,000 nodes
  - [x] Dante Search (700th death anniversary coming up!): ca. 46,000 tokens
  - [x] *Querolus sive Aulularia*: ca. 17,000 tokens
  - [ ] PROIEL and LLCT treebanks
  - [ ] Computational Historical Semantics and LASLA Corpora
- **Lexica**
  - [x] Word Formation Latin: ca. 46,000 lemmas (Classical Latin)
  - [x] Etymological dictionary of Latin & the other Italic Langs.: ca. 1,400 entries
  - [x] LatinAffectus: ca. 2,300 entries
  - [x] Index Graecorum Vocabulorum in Linguam Latinam: ca. 1,800 entries
  - [x] Latin WordNet: ca. 1,000 manually checked entries
  - [x] Latin Vallex 2.0: Valency Lexicon
  - [ ] Lewis & Short Dictionary
- **NLP tools**
  - [x] LEMLAT (lemma bank): ca. 150,000 lemmas
- **TOTAL: approximately 13 million triples**

## Query Interface, Triplestore and Linker

- https://lila-erc.eu/query/; https://lila-erc.eu/sparql/
- http://lila-erc.eu:8080/LiLaTextLinker/

## Linguistic Resources. Corpora

- https://lila-erc.eu/data/corpora/ITTB/id/corpus
- https://lila-erc.eu/data/corpora/DanteSearch/id/corpus
- https://lila-erc.eu/data/corpora/Querolus/id/citationUnit/QuerolussiveAulularia

## Linguistic Resources. Lexica

- https://lila-erc.eu/data/lexicalResources/BrillEDL/Lexicon
- https://lila-erc.eu/data/lexicalResources/LatinAffectus/Lexicon
- https://lila-erc.eu/data/lexicalResources/IGVLL/Lexicon
- http://lila-erc.eu/data/lexicalResources/LatinWordNet/Lexicon
- https://lila-erc.eu/data/lexicalResources/LatinVallex/Lexicon

# Thanks!
## Get in touch



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