



Merging Terminology and Knowledge

The power of Eurovoc and IATE through semantic integration

An ENDORSE Workshop Hosted by EU Publications Office
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Presented by



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CEO

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founded and exited



founded



chair of



CEO of



inventor of



joined industry at



product managed



contributes to



active in



About Coreon GmbH



Coreon Multilingual Knowledge System

Fusion of Terminology Management with
Knowledge Graph Modelling

to Enable Multilingual AI

- Founded 2012
- Headquarter: Berlin, Germany
- Management owned



LIEBHERR



SIEMENS
Ingenuity for life

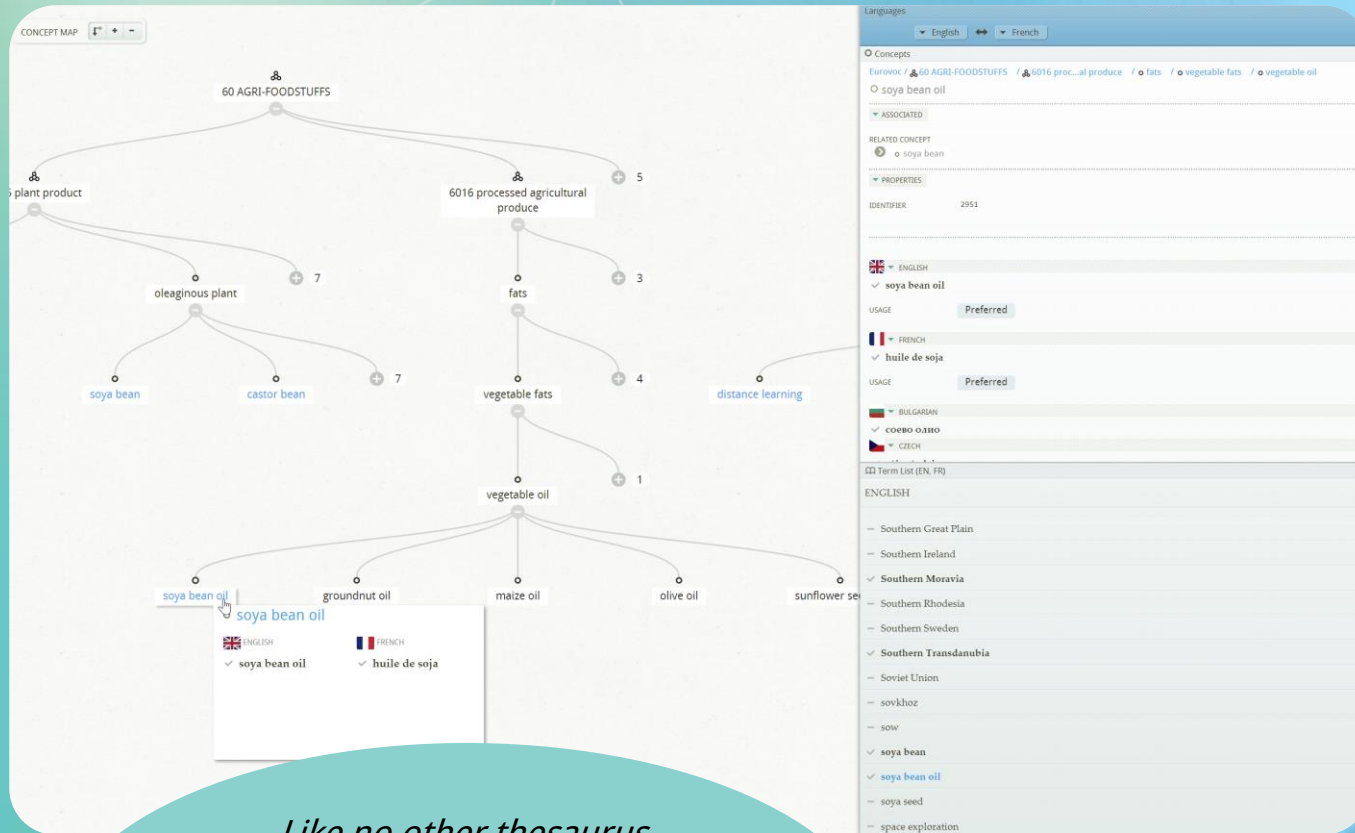


**Technology
Arts Sciences
TH Köln**



100% focus -
nothing else

Coreon: Multilingual Knowledge System

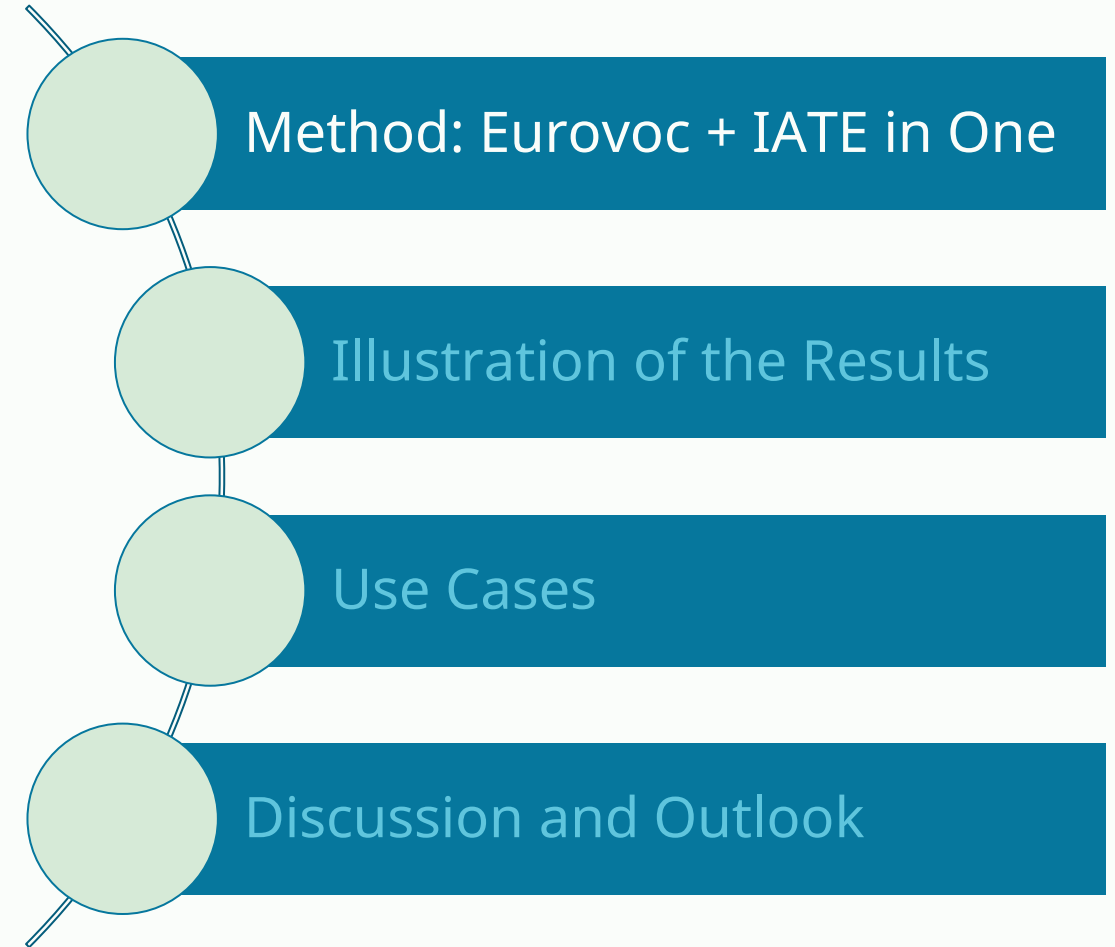


*Like no other thesaurus, taxonomy or terminology tool – Coreon turned out to be the **only comprehensive solution** to implement a multilingual knowledge system.*

Lukas Auer, Liebherr MCCtec, Rostock

- ▶ A fusion of terminology management with knowledge graphs
- ▶ Unlike simple lists or translation-only focused term tools and unlike monolingual, nerdy ontology editors ...
- ▶ ... most systematic and visual way to control and share large multilingual knowledge graphs
- ▶ Repositories scale from
 - ▶ ~100 to ~200,000+ concepts
 - ▶ monolingual and up to 50+ languages
- ▶ Configurable meta data to the needs of customer domains
- ▶ Operated as a SaaS solution

Agenda: Merging Terminology and Knowledge



About Eurovoc



- Managed, curated and shared by the Publications Office of the European Union
- Multilingual, multidisciplinary thesaurus covering the activities of the EU
- ~ 7500 concepts

Eurovoc – Samples

Home > EU Vocabularies > Controlled vocabularies > Concept

Home Controlled vocabularies Models Business collections Online tools Releases Help

Permanent link Add to my lists Create alert CONTRIBUTE

Concept
product life CURRENT

Version: n/a
Concept URI: <http://eurovoc.europa.eu/3642>

[Browse content](#)

UF: duration of product life
product wear and tear
durability

Last modification: 12/01/2023
Identifier: 3642

20 TRADE

MT [2026 consumption](#)

BT1 [product quality](#)
BT2 [consumer protection](#)
BT3 [consumer](#)

Mapping
= Has Exact Match
[Product life](#)
<http://zbw.eu/stw/descriptor/12807-1>
<http://www.eionet.europa.eu/gemet/concept/10935>

Language equivalents

BG [живот на продукта](#)
ES [duración del producto](#)
CS [životnost výrobku](#)
DA [produktlevetid](#)
DE [Produktlebenszyklus](#)
ET [toote kestus](#)
EL [διάρκεια ζωής του προϊόντος](#)
EN product life
FR [durée de vie du produit](#)
GA [saolré táirge](#)
HR [vijek trajanja proizvoda](#)
IT [durata di un prodotto](#)
LV [produkta dzīves cikls](#)
LT [produkto naudojimo trukmė](#)
HU [termék élettartama](#)
MT [hajja tal-prodott](#)
NL [levensduur van het product](#)
PL [cykl życia produktu](#)
PT [duração de vida do produto](#)

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Home > EU Vocabularies > Controlled vocabularies > Concept

Home Controlled vocabularies Models Business collections Online tools Releases Help

Permanent link Add to my lists Create alert CONTRIBUTE

Concept
international trade law CURRENT

Version: 4.0
Concept URI: <http://eurovoc.europa.eu/6923>

[Browse content](#)

Identifier: 6923

12 LAW

MT [1231 international law](#)

BT1 [international economic law](#)

RT [commercial law](#) [2006]
RT [international trade](#) [2021]

Mapping
= Has Exact Match
[International trade law](#)
<http://zbw.eu/stw/descriptor/19329-4>
<http://metadata.un.org/thesaurus/1003341>
= Has Close Match
<http://www.wikidata.org/entity/Q1946268>

Language equivalents

BG [международно търговско право](#)
ES [Derecho comercial internacional](#)
CS [mezinárodní obchodní právo](#)
DA [international handelsret](#)
DE [internationales Handelsrecht](#)
ET [rahvusvaheline kaubandusõigus](#)
EL [διεθνές εμπόρικό δίκαιο](#)
EN international trade law
FR [droit commercial international](#)
GA [dlí trádála idimáisiúnta](#)
HR [međunarodno trgovačko pravo](#)
IT [diritto commerciale internazionale](#)
LV [starptautiskās tirdzniecības tiesības](#)
LT [tarptautinė prekybos teisė](#)
HU [nemzetközi kereskedelmi jog](#)

[Go to asset list](#)
[Dataset details](#)
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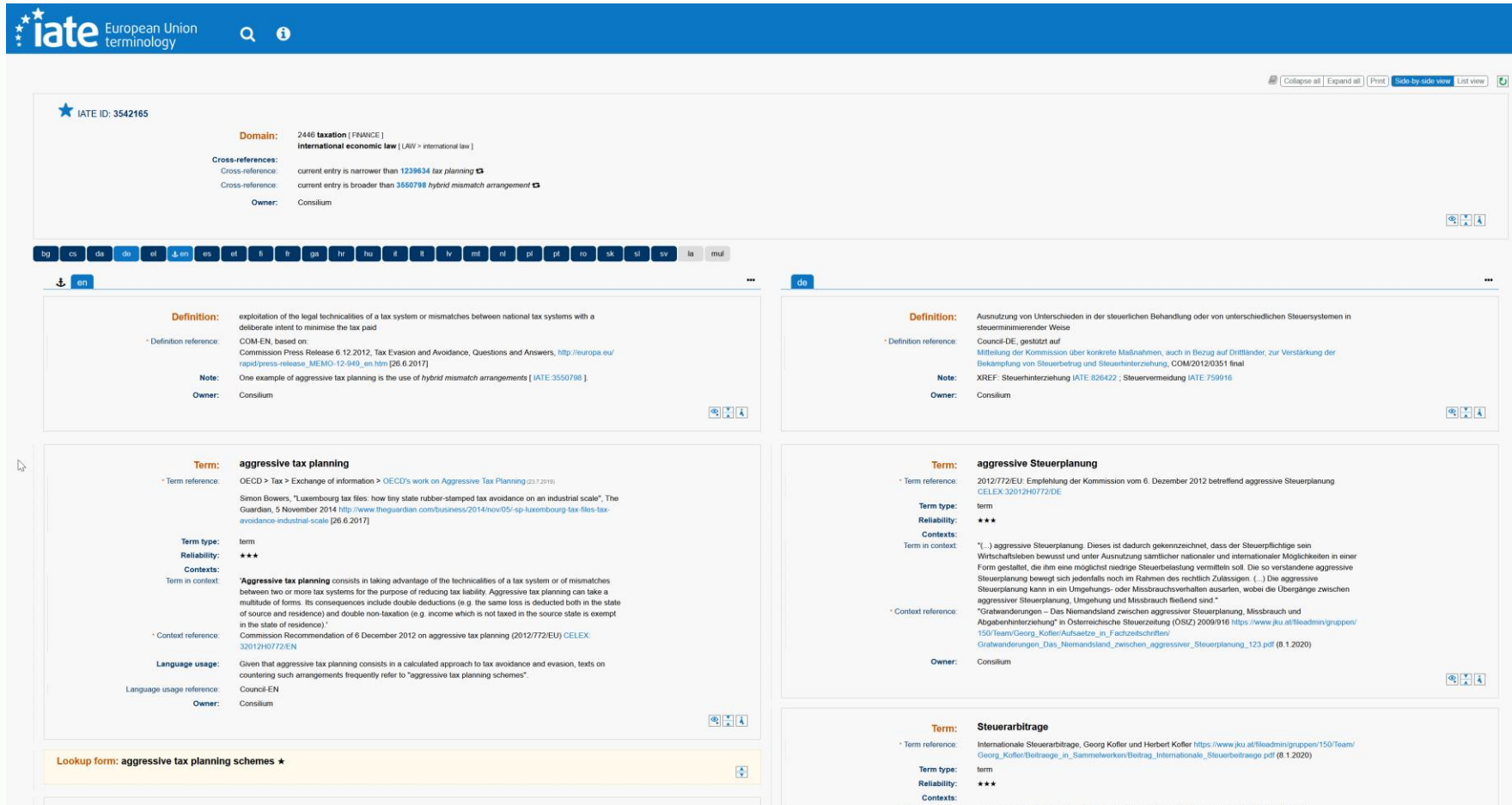
<https://op.europa.eu/en/web/eu-vocabularies/concept/-/resource?uri=http://eurovoc.europa.eu/3642>

About IATE



- Administered by the Translation Centre for the Bodies of the European Union
- The terminology database of the European Union
- 670,000+ concepts, covering 7 million terms

IATE – a Sample



The screenshot displays the IATE (European Union terminology) website interface. The top navigation bar includes the IATE logo, search icons, and language selection buttons. The main content area shows the entry for IATE ID: 3542165, which is 'aggressive tax planning' in English and 'aggressive Steuerplanung' in German. The entry details include the domain (2446 taxation [FRANCE]), cross-references, owner (Consilium), and a definition. The English definition states: 'exploitation of the legal technicalities of a tax system or mismatches between national tax systems with a deliberate intent to minimise the tax paid'. The German definition states: 'Ausnutzung von Unterschieden in der steuerlichen Behandlung oder von unterschiedlichen Steuersystemen in steuermindernder Weise'. The entry also includes a term reference, term type, reliability, contexts, and language usage. A 'Lookup form' for 'aggressive tax planning schemes' is visible at the bottom.

<https://iate.europa.eu/entry/result/3542165/en>

Eurovoc + IATE: Complementary Resources



- Used for indexing, a meta data “vocabulary” for EU publications and texts
- Hierarchical “top level” taxonomy

= a *knowledge graph*



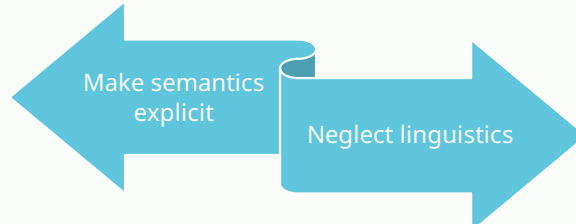
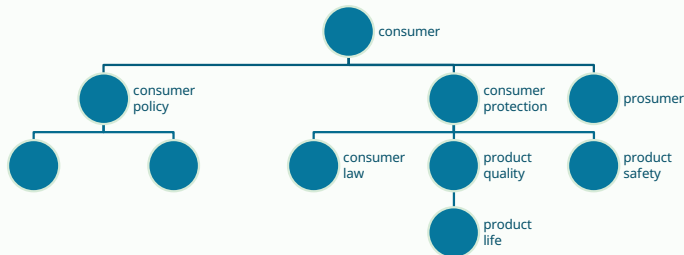
- For translation and any variant of multilingual text work
- A large, very detailed language resource that (probably?) covers more or less all things ever dealt with by EU

= a *terminology database*

What do they contain?

Knowledge Graphs (such as Eurovoc)

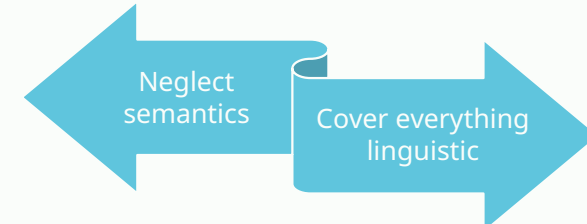
- 1) Store concepts and their *labels*
- 2) Relate concepts to each other in a hierarchical or associative manner



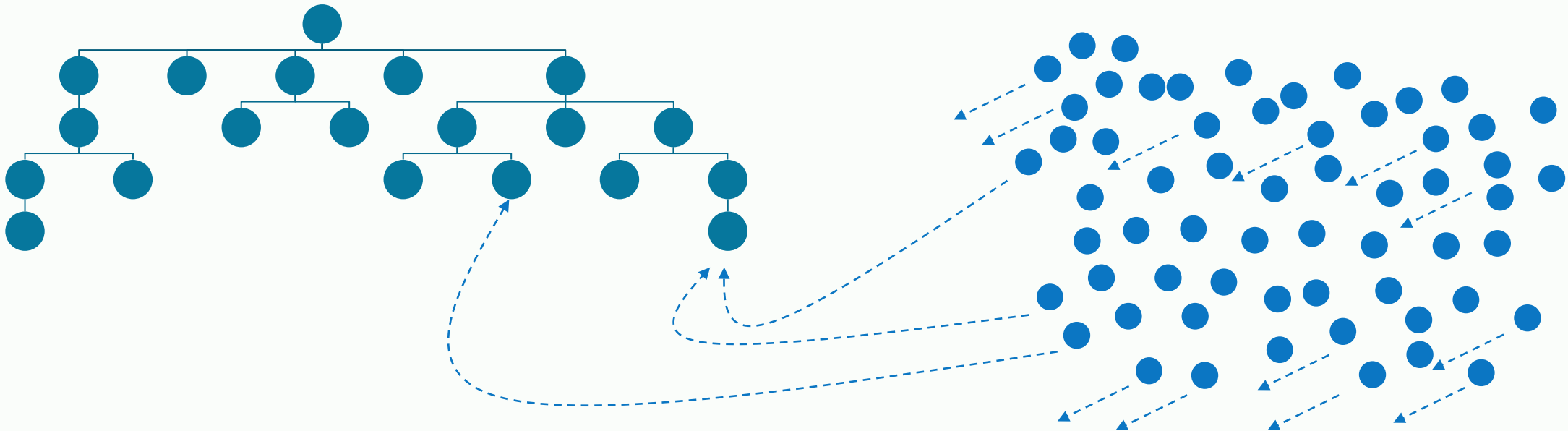
Terminology Resources (such as IATE)

- 1) Store concepts and their *terms*
- 2) Store a lot of descriptive and prescriptive information about the concepts and the terms: Definitions, Notes, Usage Guidance ...

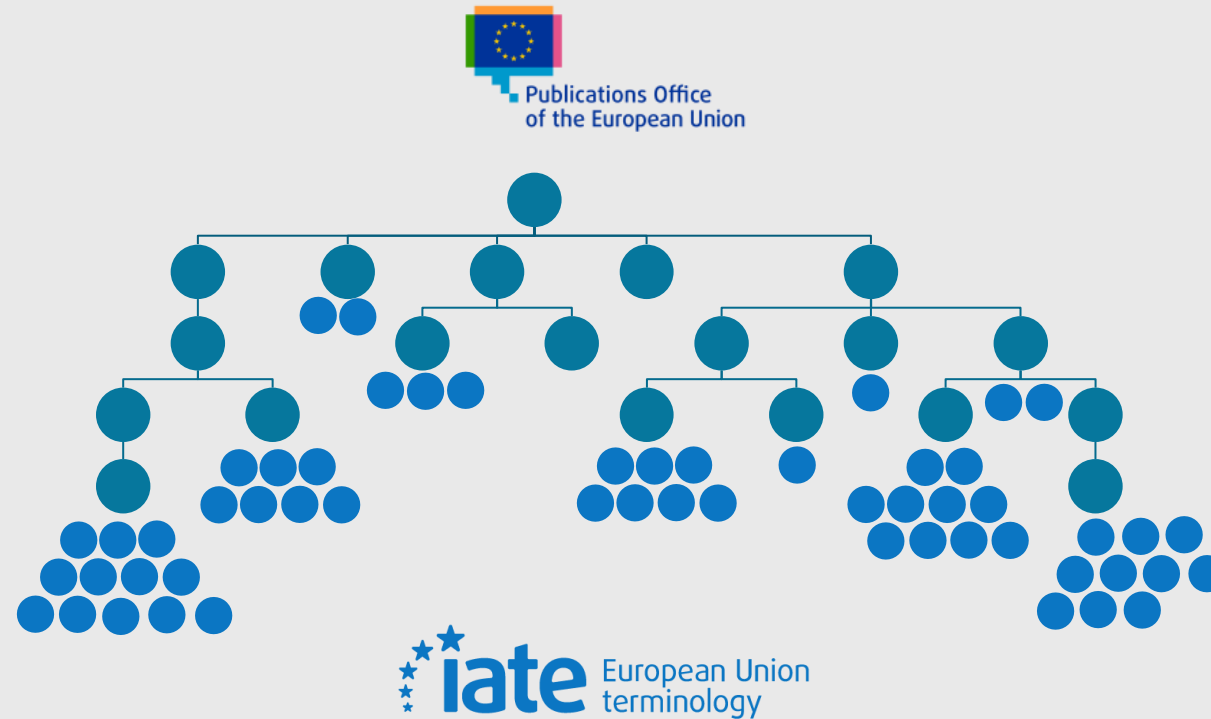
Abbrev: ATP
*** Term reference:** OECD > Tax > Exchange of information > OECD's work on Aggressive Tax Planning; exchange-of-tax-information/atp.htm [4.7.2017]
Term type: abbrev
Reliability: ★★★
Owner: Consilium



Idea: Hook all IATE Concepts within the Eurovoc Knowledge Graph

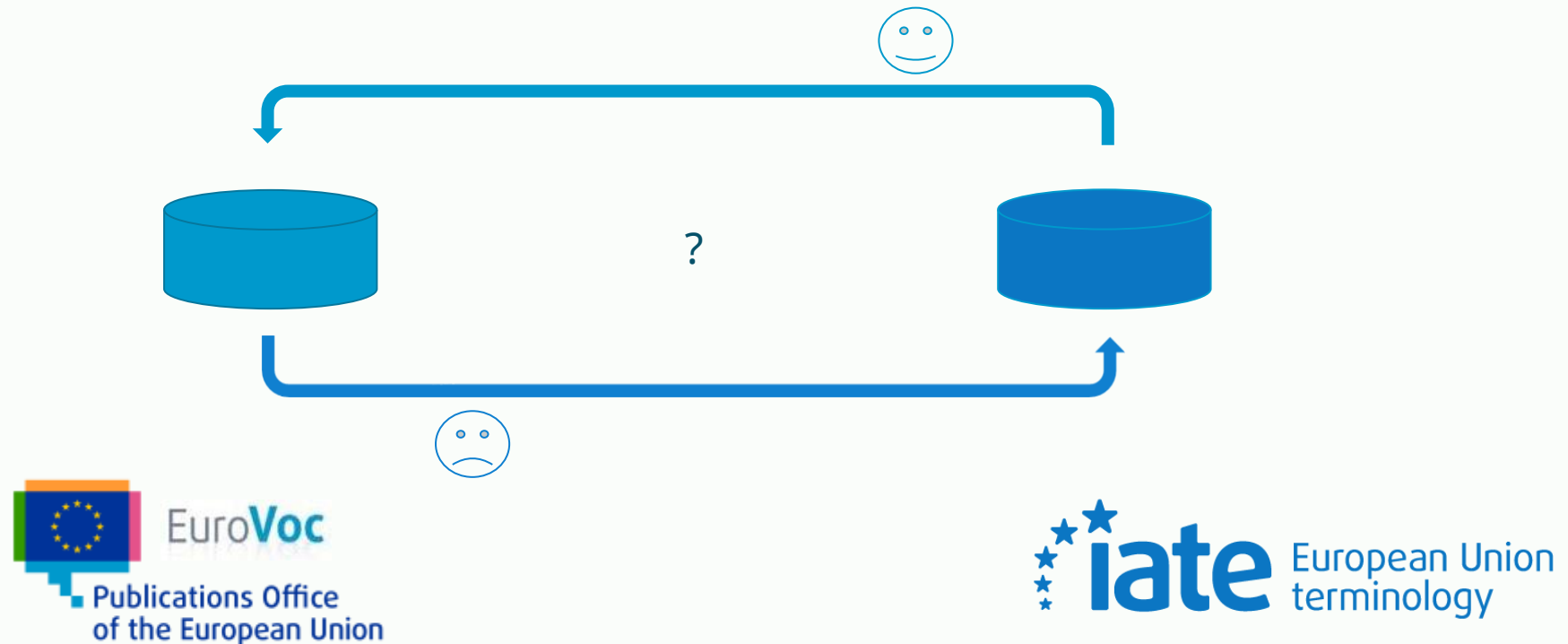


Idea: Hook all IATE Concepts within the Eurovoc Knowledge Graph



One unified, large, linguistically rich knowledge graph

Is there already a link between IATE and Eurovoc?



How? Use the “Domain” code as anchor

EuroVoc

 Concept
international economic law CURRENT

Version: n/a
Concept UR: <http://eurovoc.europa.eu/4010>

[Browse content](#)

Identifier: 4010

[12 LAW](#)

MT [1231 international law](#)

NT1 [international trade law](#)

RT [competition law](#) [40341]

RT [international monetary system](#) [2406]

RT [law of banking](#) [2416]

RT [multinational enterprise](#) [4011]

Language equivalents

BG [международно икономическо право](#)

ES [Derecho internacional económico](#)

CS [mezinárodní hospodářské právo](#)

DA [international økonomisk ret](#)


DE [internationales Wirtschaftsrecht](#)

ET [rahvusvaheline majandusõigus](#)

EL [διεθνές οικονομικό δικαίο](#)

EN international economic law

- IATE entries “mention” Eurovoc node labels as domain codes

 **iate** European Union terminology

IATE ID: 3542165

Domain: 2446 **taxation** [FINANCE]
international economic law [LAW > international law]

Cross-references:
Cross-reference: current entry is narrower than **1239634 tax planning** ↗
Cross-reference: current entry is broader than **3550798 hybrid mismatch arrangement** ↘

Owner: Consilium

bg cs da de el en es et fi fr ga hr hu it lt lv mt nl pl pt ro sk sl sv ua mul

Domain: 2446 **taxation** [FINANCE]
international economic law [LAW > international law]

Cross-references:
Cross-reference: current entry is narrower than **1239634 tax planning** ↗
Cross-reference: current entry is broader than **3550798 hybrid mismatch arrangement** ↘

How? Use the “Domain” / “subjectField” as the technical link

- Eurovoc W3C SKOS RDF

- IATE ISO TBX

```
<?xml version="1.0" encoding="UTF-8"?>
<rdf:RDF xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#" xmlns:rdfs=
"http://www.w3.org/2000/01/rdf-schema#" xmlns:dcterms="http://purl.org/dc/terms/" xmlns:owl=
"http://www.w3.org/2002/07/owl#" xmlns:skos="http://www.w3.org/2004/02/skos/core#" xmlns:ns5=
"http://www.w3.org/2008/05/skos-xl#" xmlns:ns6="http://publications.europa.eu/ontology/euvoc#"
"http://purl.org/dc/elements/1.1/">
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  <rdf:Description rdf:about="http://eurovoc.europa.eu/550">
  <rdf:Description rdf:about="http://eurovoc.europa.eu/4010">
    <rdf:type rdf:resource="http://eurovoc.europa.eu/schema#ThesaurusConcept"/>
    <rdf:type rdf:resource="http://www.w3.org/2004/02/skos/core#Concept"/>
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    <owl:versionInfo>n/a</owl:versionInfo>
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    <skos:prefLabel xml:lang="pt">direito internacional económico</skos:prefLabel>
    <skos:prefLabel xml:lang="en">international economic law</skos:prefLabel>
    <skos:prefLabel xml:lang="hr">međunarodno ekonomsko pravo</skos:prefLabel>
    <skos:prefLabel xml:lang="fi">kansainvälinen talousoikeus</skos:prefLabel>
    <skos:prefLabel xml:lang="bg">меѓународно икономическо право</skos:prefLabel>
    <skos:prefLabel xml:lang="ga">dlí eacnamaíochta idirnáisiúnta</skos:prefLabel>
    <skos:prefLabel xml:lang="sv">internationell ekonomisk lagstiftning</skos:prefLabel>
    <skos:prefLabel xml:lang="et">rahvusvaheline majandusõigus</skos:prefLabel>
    <dcterms:identifier>4010</dcterms:identifier>
    <ns5:altLabel rdf:resource="http://eurovoc.europa.eu/134496"/>
    <ns5:altLabel rdf:resource="http://eurovoc.europa.eu/293346"/>
    <ns5:altLabel rdf:resource="http://eurovoc.europa.eu/338714"/>
```

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  <descrip type="lifecycle"/>
  <descrip type="subjectField">international economic law;taxation</descrip>
  <descrip type="origin"/>
  <langSec xml:lang="ga">
  <langSec xml:lang="de">
  <langSec xml:lang="bg">
  <langSec xml:lang="hr">
  <langSec xml:lang="en">
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      <descrip type="reliabilityCode">9</descrip>
      <descrip type="ownerInstitution">Consilium</descrip>
      <descrip type="modificationTimestamp"/>
    </termSec>
    <termSec>
      <term>aggressive tax planning</term>
      <termNote type="termType">fullForm</termNote>
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</conceptEntry>
```

Eurovoc #4010

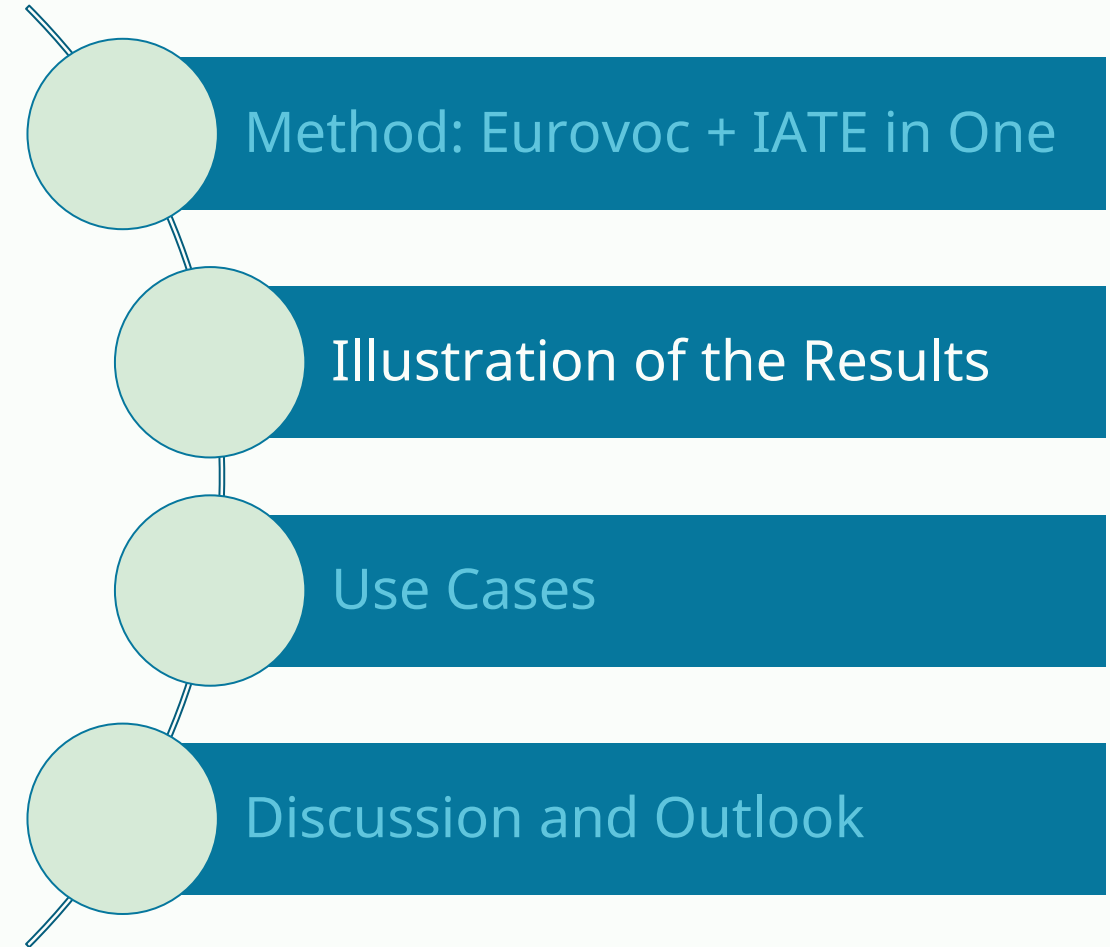
has-narrower

IATE #3542165

TATF #3623621

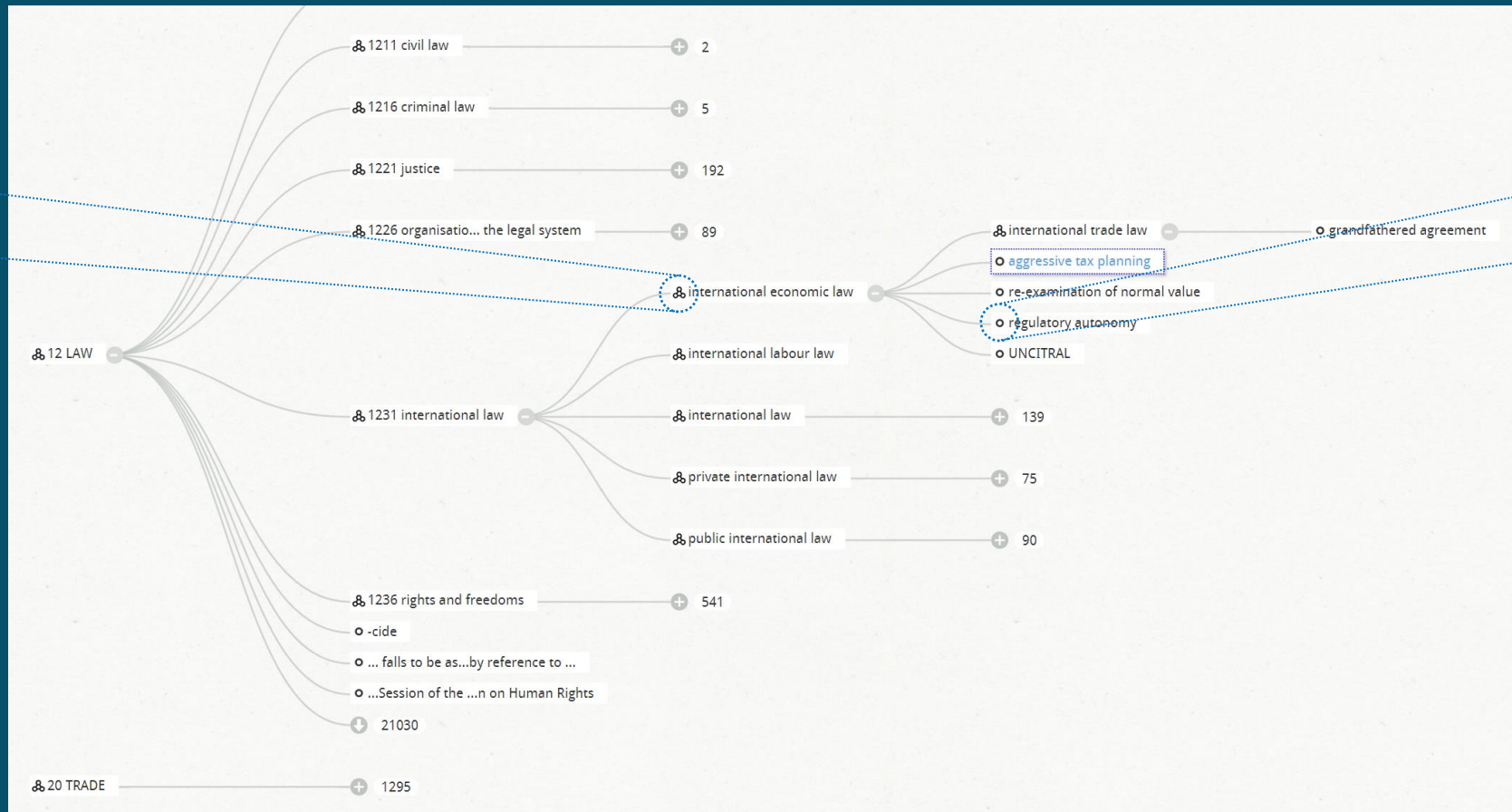
TATF #2210766

Agenda: Merging Terminology and Knowledge



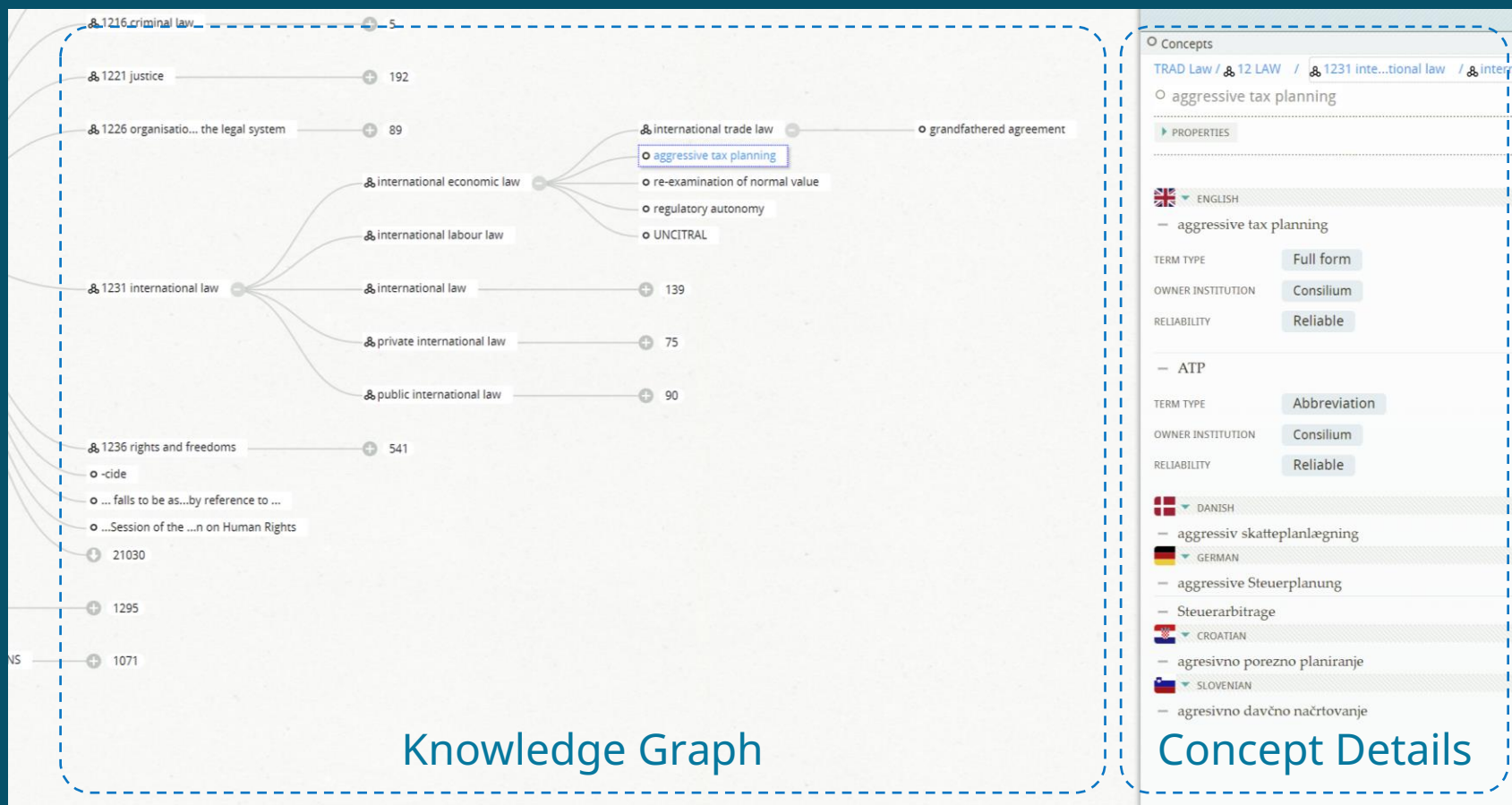


Eurovoc node



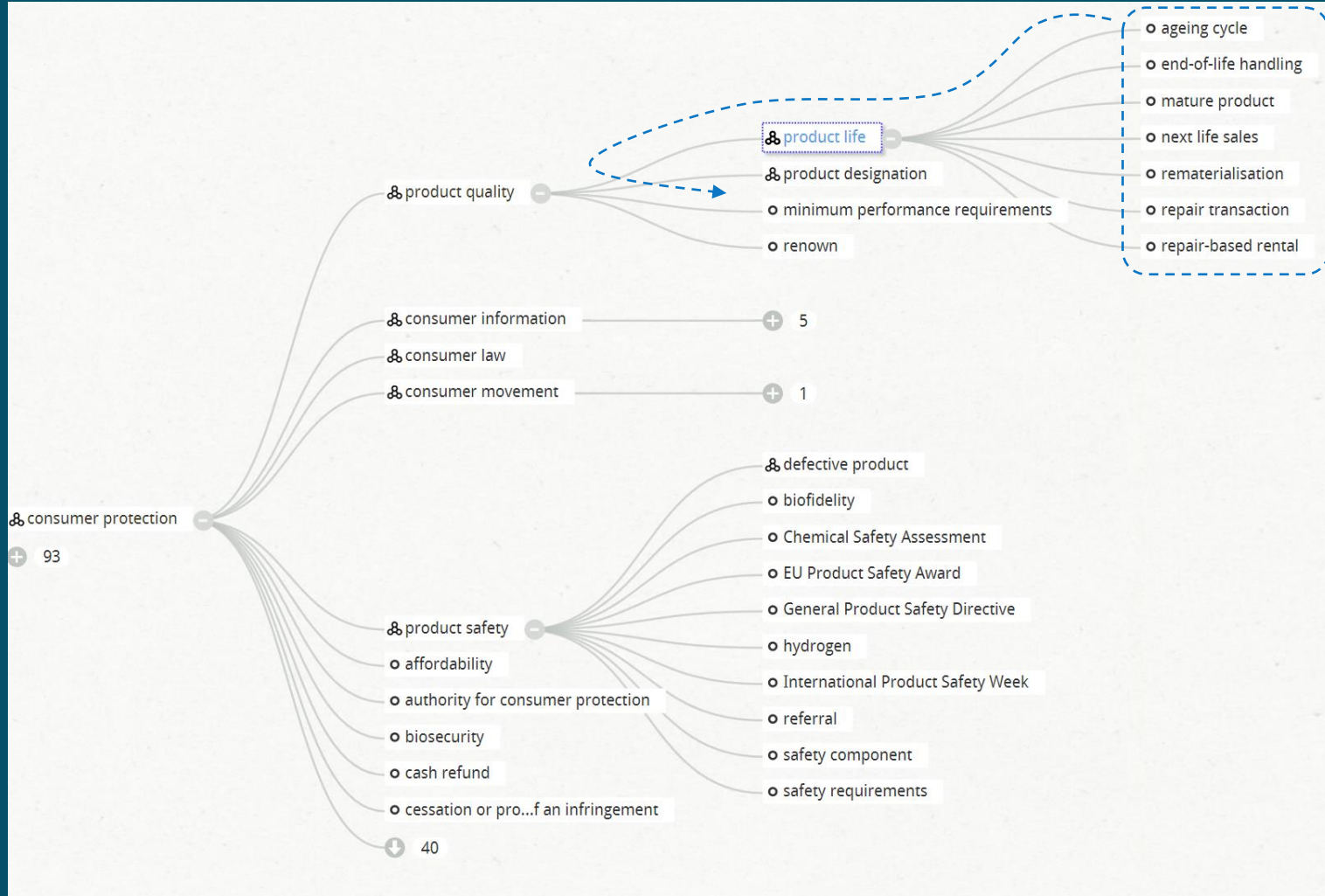
IATE concept

Eurovoc + IATE in One



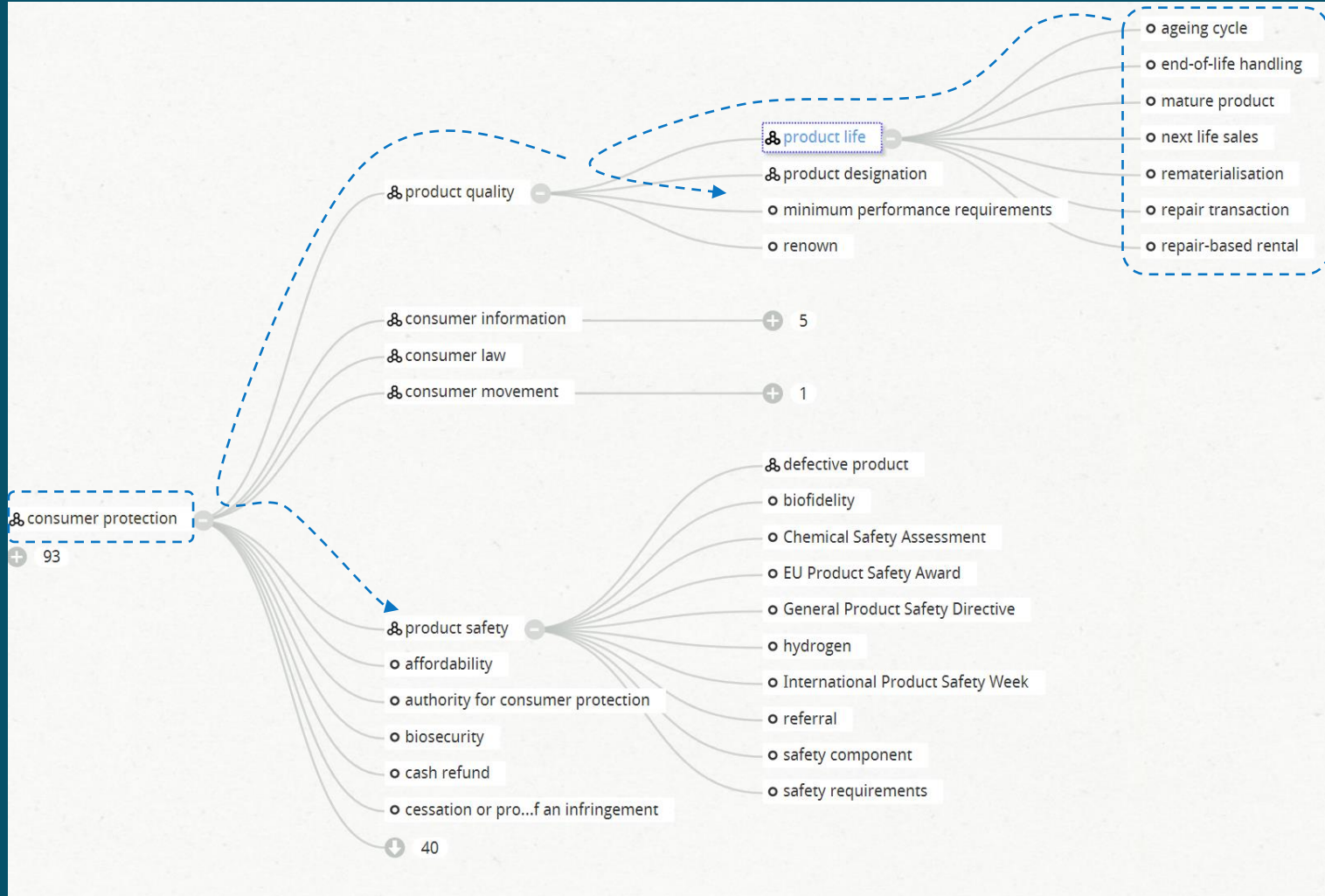
Reading the Details of a IATE Concept while Browsing the Knowledge Graph

Related IATE Concepts now “close” to each other



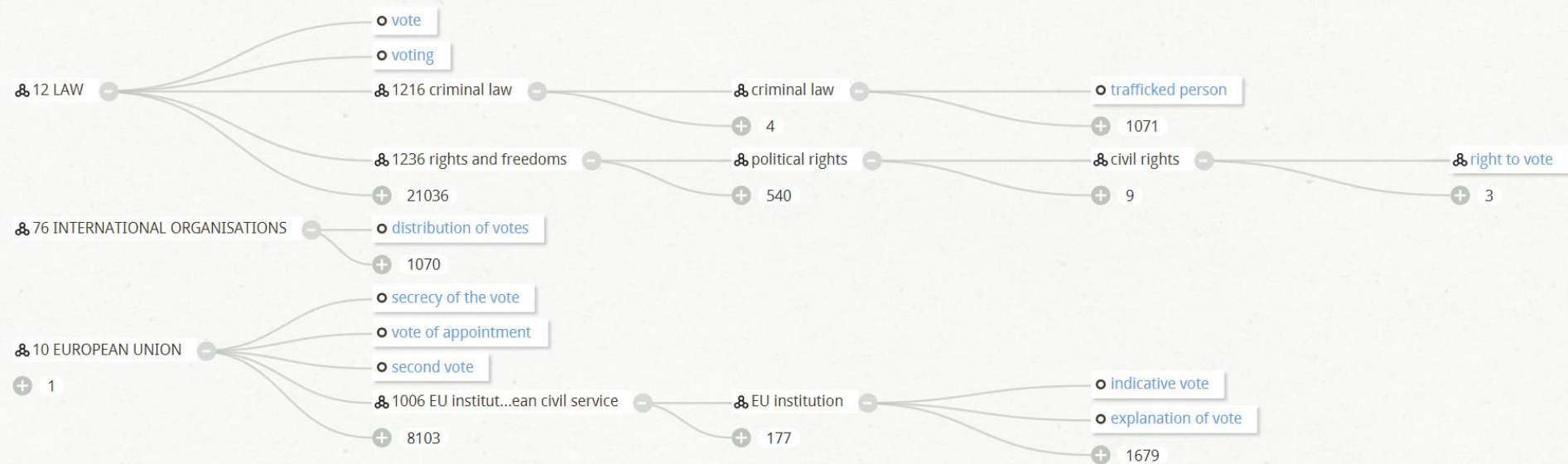
- Visually and technically close, such as ...
- “... all IATE concepts that deal with ‘product life’ ”
- ... and more general with ‘product quality’

Related IATE Concepts now “close” to each other



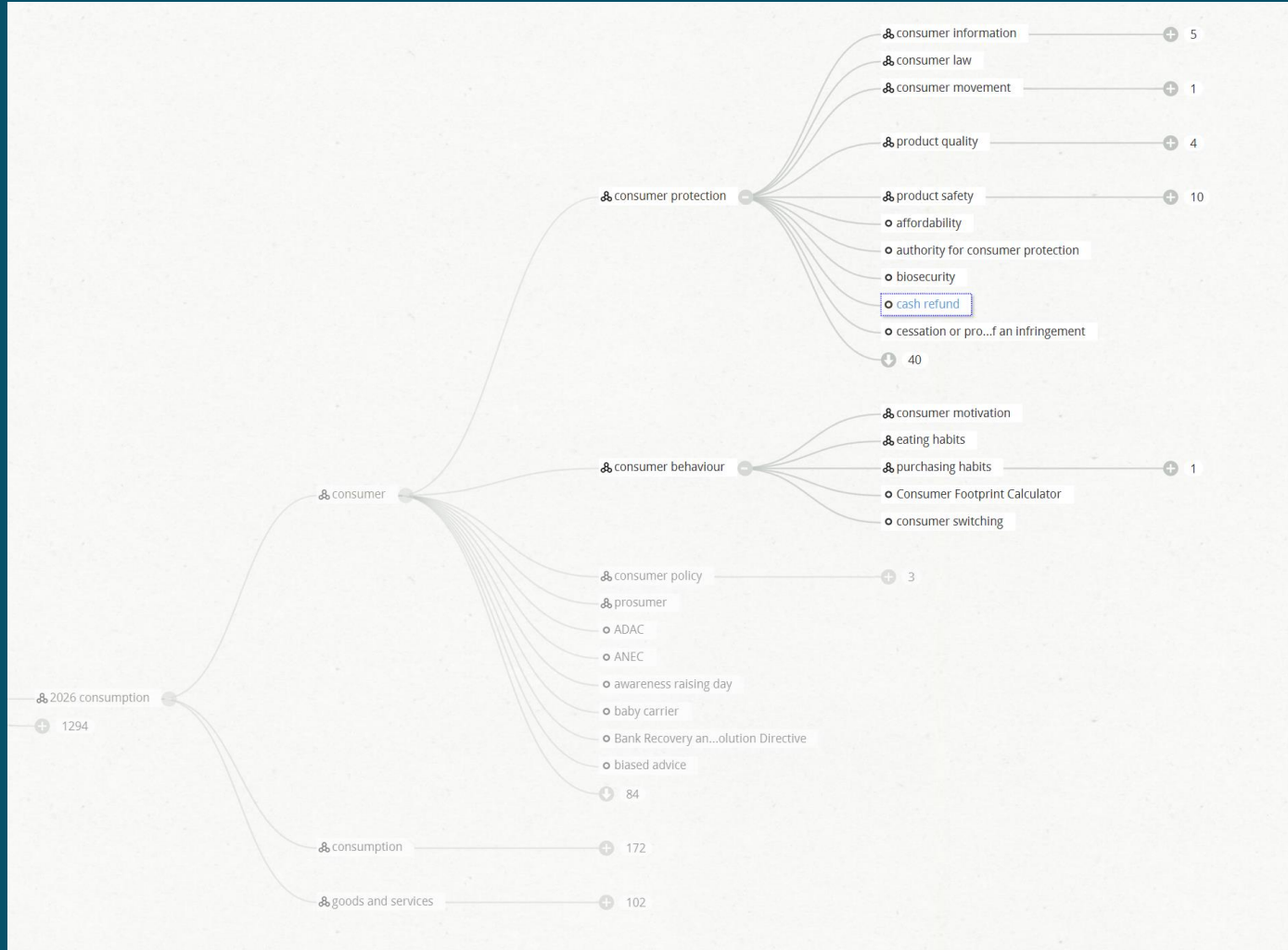
- ... and even with 'product safety'

(since all in the branch of 'consumer protection')



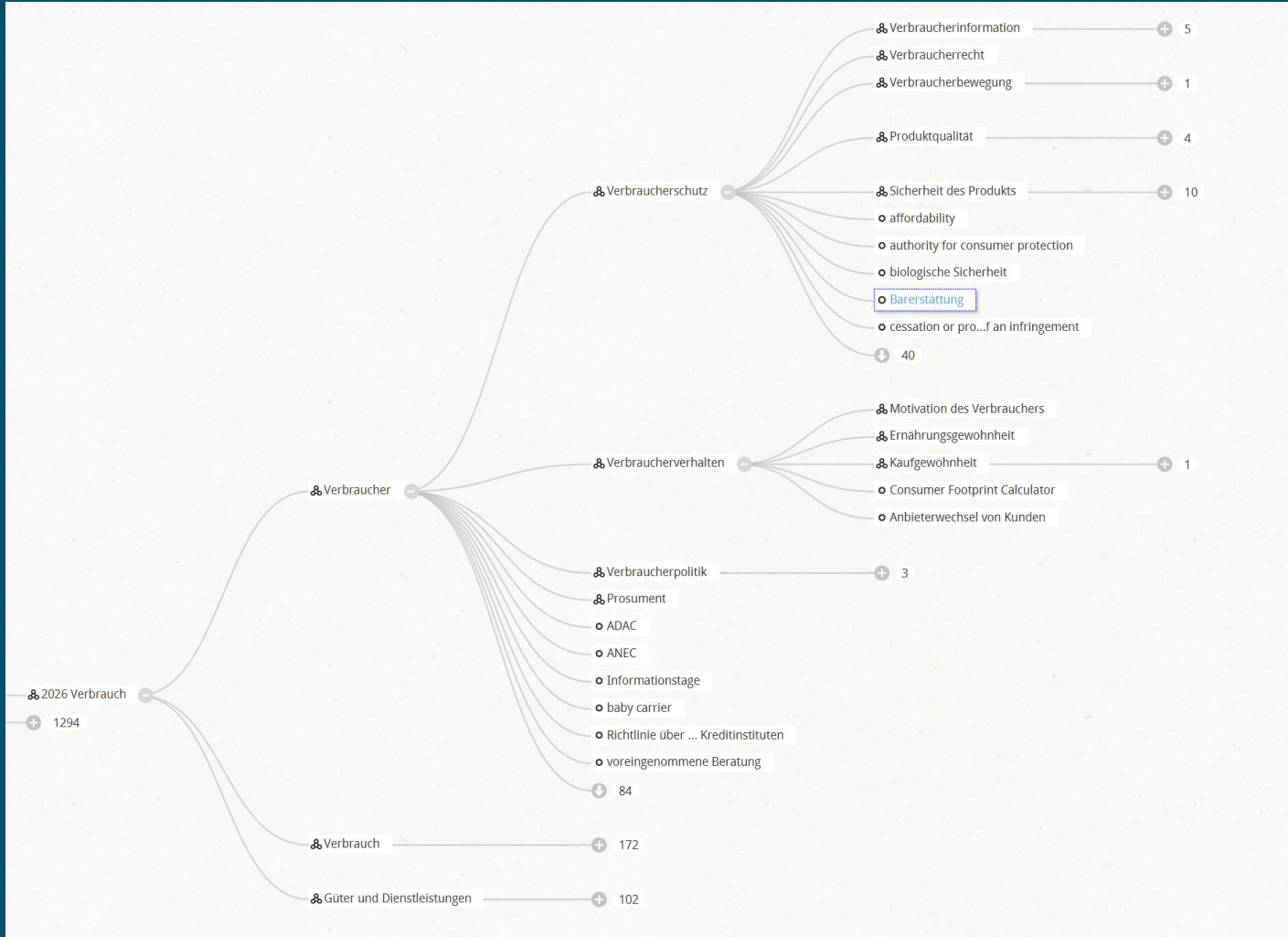
Search for "vote":
understand in which branch the hits from IATE reside

Filter, Search, Export – Re-use by Branches



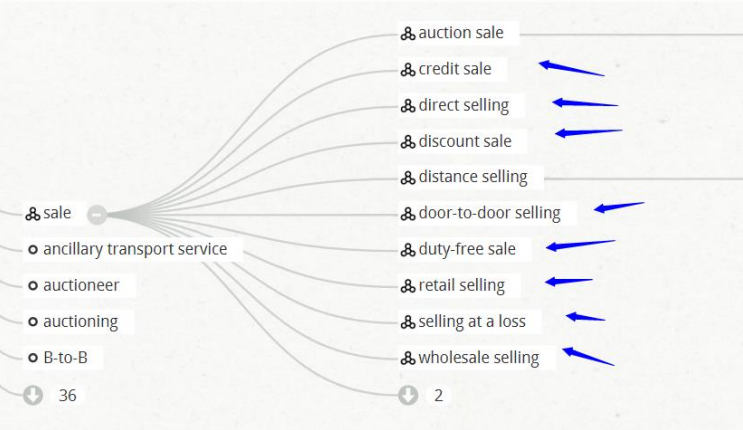
- “Get me all concepts under ‘consumer’”
- “Export all En, Fr, It terms that are in the branch of ‘consumer behaviour’ ”
- “Get me translations for terms in branches <x> and <y> but not <z> ...”

Last but not least: In any EU Language

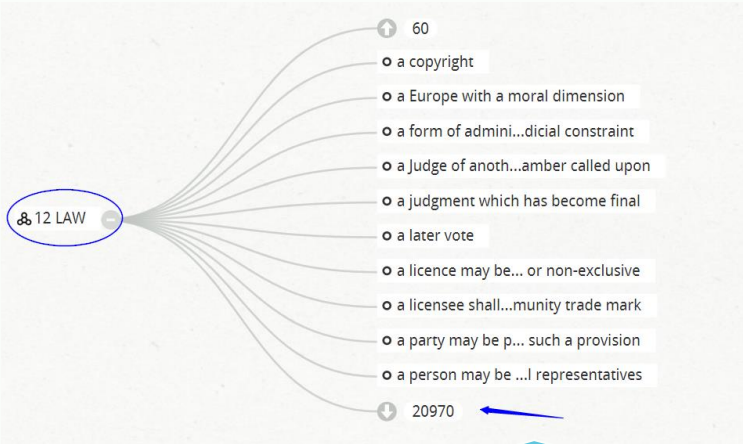


- The knowledge graph – as is Eurovoc – is based on relations between concepts, thus it is “language agnostic”
- Once deployed it can be used for any EU language

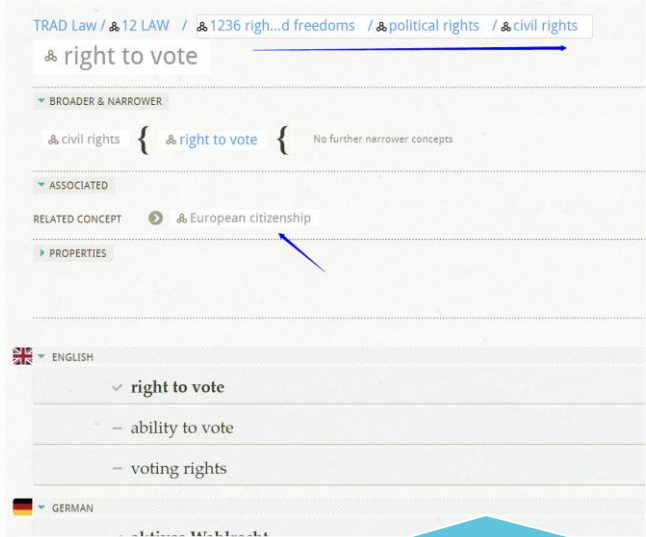
Eurovoc + IATE: Observations



Many Eurovoc nodes are not used at all by IATE



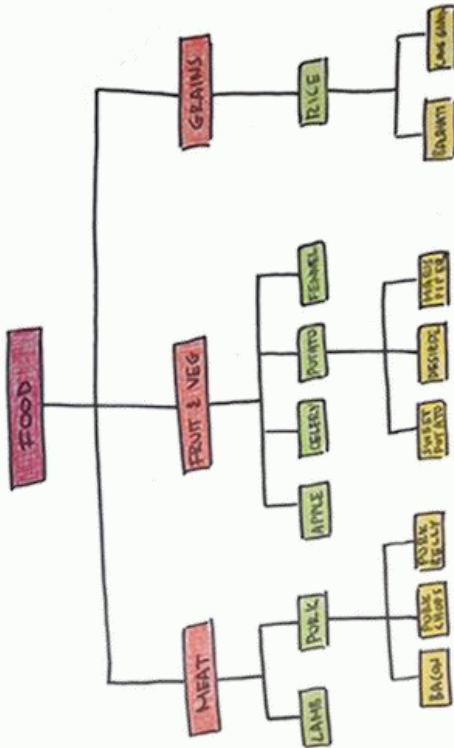
Whereas many IATE concepts are just tagged with often generic Eurovoc nodes



A screenshot of the IATE interface showing the 'right to vote' concept. The breadcrumb trail is: TRAD Law / 12 LAW / 1236 righ...d freedoms / political rights / civil rights. The concept is 'right to vote'. The 'BROADER & NARROWER' section shows 'civil rights' as a broader concept and 'No further narrower concepts' as a narrower concept. The 'ASSOCIATED' section shows 'European citizenship' as an associated concept. The 'RELATED CONCEPT' section shows 'European citizenship' as a related concept. The 'PROPERTIES' section shows 'ability to vote' and 'voting rights' as properties. The interface is in English and German.

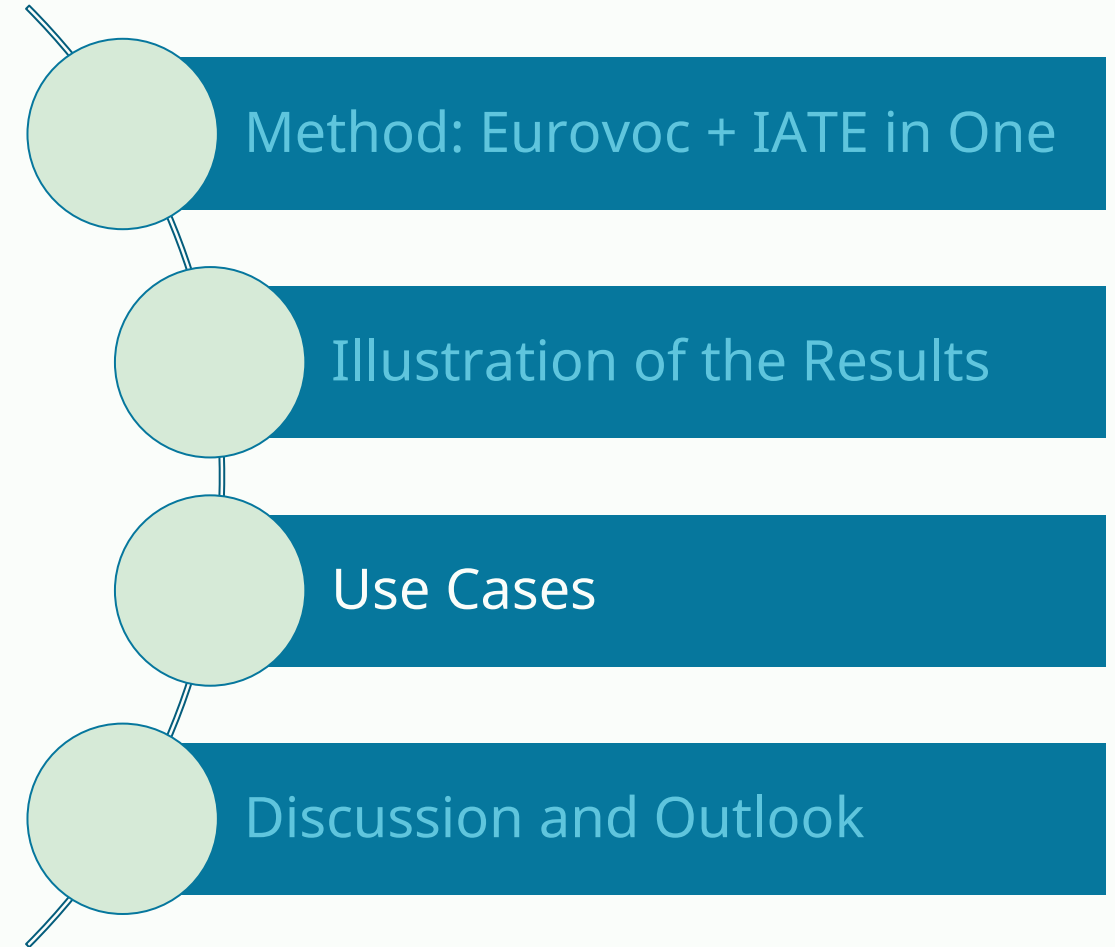
IATE concepts hooked in Eurovoc may immediately benefit from Eurovoc's associative relations

Why a Knowledge Graph for Terminologists and Linguists

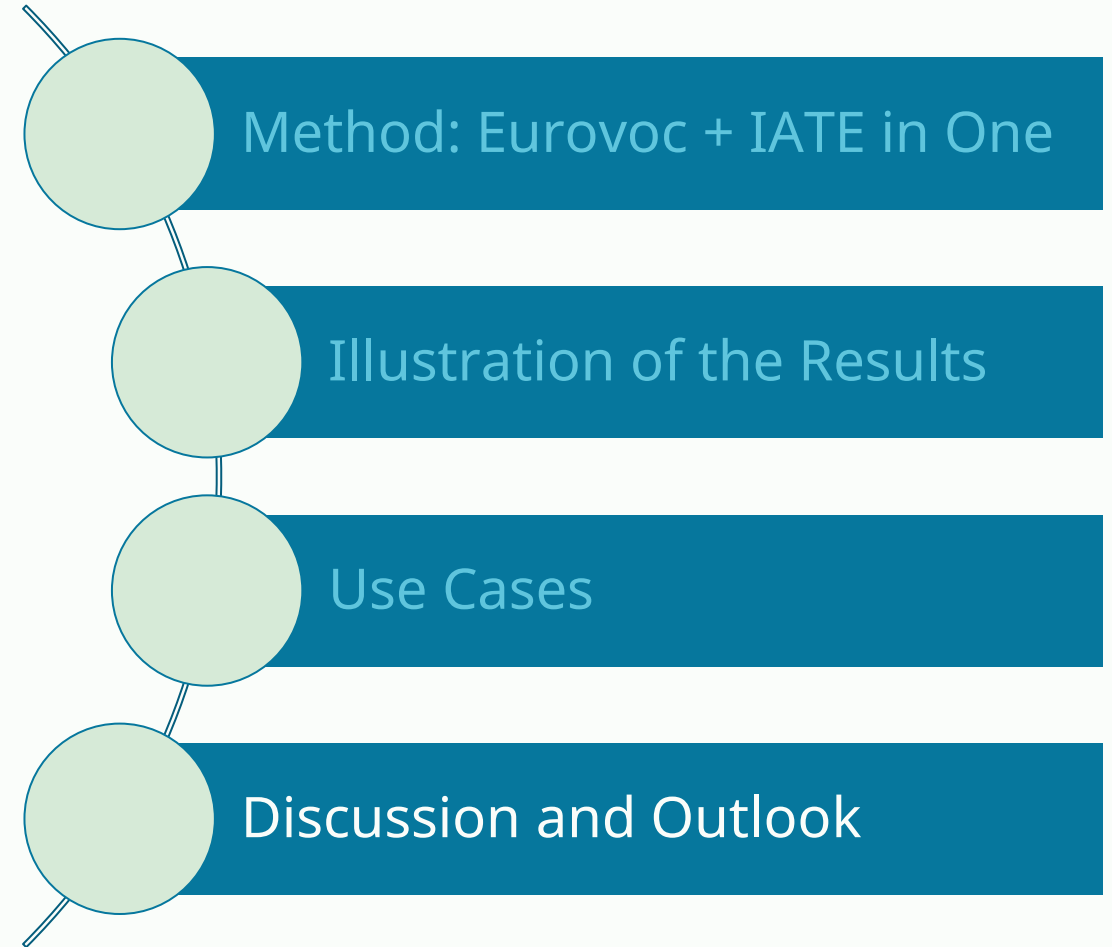


- ⌘ Effective way to add structure to terminology collections
- ⌘ Improve data quality
 - ⌘ avoid duplicates and overlapping concepts
 - ⌘ associative relations
- ⌘ Easier data maintenance: similar “things” are close to each other
- ⌘ Formalize multilingual knowledge, make it machine-digestible
- ⌘ Boost performance of AI algorithms, priming them with structured data

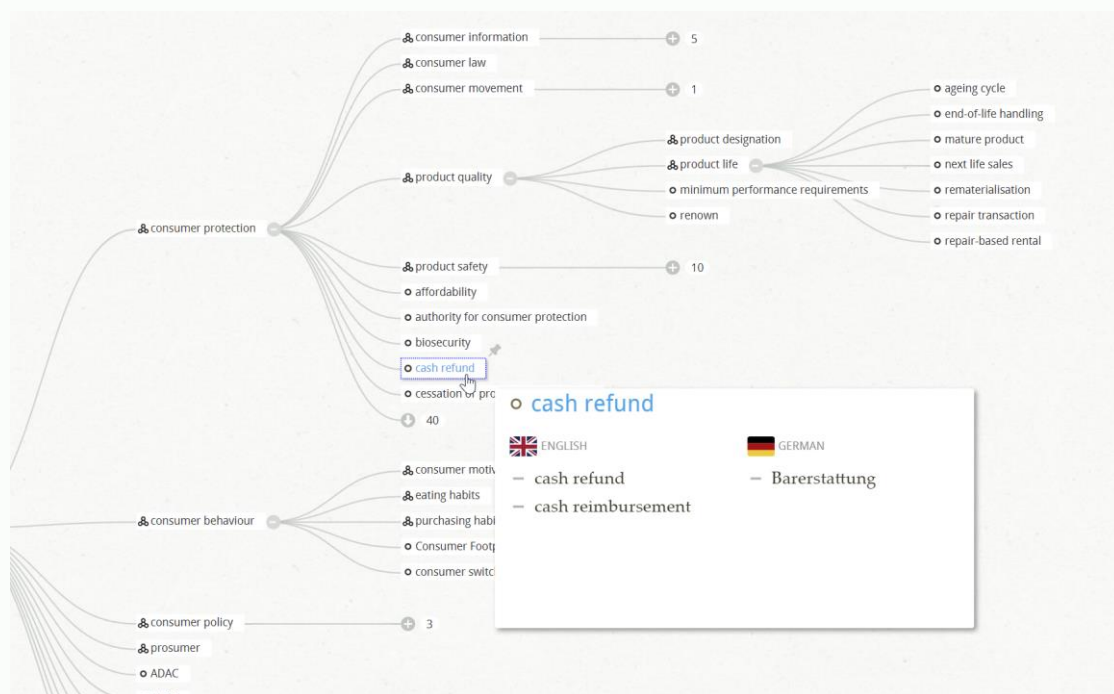
Agenda: Merging Terminology and Knowledge



Agenda: Merging Terminology and Knowledge



Key Messages: Merging Terminology with Knowledge



- Benefits for data maintainers and consumers
- Eurovoc adds semantics to IATE, IATE is like a “linguistic amplifier” for Eurovoc
- Linguistically rich knowledge graphs enable M-RAG, multilingual indexing, interoperability, cross-language search ...



Thanks a lot!

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