

Ontologies are stored in text files

vivo.owl lang.owl aeon.owl

```
<?xml version="1.0"?>
     <rdf:RDF xmlns="http://purl.obolibrary.org/obo/lang.owl#"
         xml:base="http://purl.obolibrary.org/obo/lang.owl"
         xmlns:dc="http://purl.org/dc/elements/1.1/"
         xmlns:obo="http://purl.obolibrary.org/obo/"
         xmlns:owl="http://www.w3.org/2002/07/owl#"
         xmlns:rdf="http://www.w3.org/1999/02/22-rdf-syntax-ns#"
         xmlns:xml="http://www.w3.org/XML/1998/namespace"
         xmlns:xsd="http://www.w3.org/2001/XMLSchema#"
         xmlns:rdfs="http://www.w3.org/2000/01/rdf-schema#"
10
         xmlns:terms="http://purl.org/dc/terms/"
11
         xmlns:oboInOwl="http://www.geneontology.org/formats/oboInOwl#">
12 ▼
        <owl:Ontology rdf:about="http://purl.obolibrary.org/obo/lang.owl">
13 ▼
            <owl:versionIRI rdf:resource="http://purl.obolibrary.org/obo/lang/re"</pre>
14
            <dc:description>The Language Ontology is a BFO-based, OBO compliant
15 ▼
            ontology of the languages of the world based on ISO 639.
16
            ISO 639-1, 2 and 3 are included. The Language Ontology includes
17
            properties of the languages from ISO 639, as well as language
18
            capabilities. The ontology is intended for use in representing the
19
            capabilities of people and organizations with respect to languages,
20
            as well as the languages of information content entities.
21
22 -
            </dc:description>
            <dc:title>Language Ontology</dc:title>
23
            <terms:license>CCO. No Rights Reserved.
24 ▼
            https://creativecommons.org/share-your-work/public-domain/cc0/
25
            </terms:license>
26 -
        </owl:Ontology>
27 -
28
29
30
31 ▼
         <!--
        32
33
        // Annotation properties
        36
37 ┗
38
40
41
```

Language is stored as text with language tags

"entity"@en "entité@fr

In translating English to French, we look for text appearing in English, and provide text in French

```
Now trainio tate urioperty runine Source = Inttp://purtropottorary.org/obo/l
                           <owl:annotatedTarget>(iff (GenericallyDependentContinuant a) (and (Continuant a) 
501
                           <obo:IAO_0010000 rdf:resource="http://purl.obolibrary.org/obo/bfo/ax:</pre>
502
                    </owl:Axiom>
503 -
505
                    <!-- http://purl.obolibrary.org/obo/LANG_0000001 -->
507
508
509 ▼
                    <owl:Class rdf:about="http://purl.obolibrary.org/obo/LANG_0000001">
                           <rdfs:subClassOf rdf:resource="http://purl.obolibrary.org/obo/BF0_000
510
                           <obo:IAO_0000112 xml:lang="en">English is a subclass of Language. A
511
                           <obo:IAO_0000115 xml:lang="en">A language is a structured system of 
512
                           <obo:IAO_0000115 xml:lang="de">Eine Sprache ist ein strukturiertes Sy
513
                           <obo:IAO_0000115 xml:lang="es">Un idioma es un sistema estructurado (
514
                           <obo:IAO_0000115 xml:lang="it">Un linguaggio è un sistema strutturato
515
                           <obo:IAO_0000115 xml:lang="fr">Une langue est un système de communica
516
                           <obo:IAO_0000116 xml:lang="en">Very early development. Change is nea
517
                           <obo:IA0_0000117 xml:lang="en">PERSON: Michael Conlon/obo:IA0_000011
518
                           <obo:IAO_0000119>http://en.wikipedia.org/wiki/Language</obo:IAO_00001</pre>
519
                           <obo:IAO_0000600 xml:lang="en">Person x has a language disposition y
520
                           <rdfs:label xml:lang="es">Idioma</rdfs:label>
521
                           <rdfs:label xml:lang="en">Language</rdfs:label>
522
                           <rdfs:label xml:lang="it">Lingua</rdfs:label>
523
                           <rdfs:label xml:lang="de">Sprache</rdfs:label>
524
                           <rdfs:label xml:lang="fr">langue</rdfs:label>
525
526 ⊾
                    </owl:Class>
527
528
529
                    <!-- http://purl.obolibrary.org/obo/LANG_0000009 -->
530
531
                    <owl:Class rdf:about="http://purl.obolibrary.org/obo/LANG_0000009">
532 ▼
                           <rdfs:subClassOf rdf:resource="http://purl.obolibrary.org/obo/BF0_000
533
                           <obo:IAO_0000112 xml:lang="en">A person has a language capability wit
534
                           <obo:IAO_0000115 xml:lang="de">Die Fähigkeit einer Entität, über eine
535
                           <obo:IAO_0000115 xml:lang="es">La capacidad que tiene una entidad par
536
                           <obo:IAO_0000115 xml:lang="it">La capacità di un&apos;entità di comur
537
                           <obo:IAO_0000115 xml:lang="fr">La capacité qu&apos;a une entité de co
538
                           <obo:IAO_0000115 xml:lang="en">The capability an entity has to commun
539
                           <obo:IAO_0000116 xml:lang="en">Language Capability is defined as a st
540
                           <obo:IAO_0000117 xml:lang="en">PERSON: Michael Conlon/obo:IAO_000011
541
```

A three step process Get, translate, put

- 1. Get the text to be translated from the ontology into a spreadsheet
- 2. Translate text in the spreadsheet
- 3. Put the translated text back into the ontology

1 Get 2 Translate 3 Put

Step 1 — Get Text Use get-text.py

get-text en fr lang.owl

We specify two languages (here English (en) and French (fr)) and the name of the file containing the ontology (lang.owl)

Get-text produces a spreadsheet with the name translate-en-fr.tsv

```
$ ls
LICENSE README.md get-text.py put-text.py

$ python3 get-text.py en fr ../language-ontology/lang.owl

$ ls
LICENSE % PROMPT='%/ get-text.py put-text.py

README.md

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```

Step 2 — Translate Edit the file from step 1

Add as many translations as you wish. Change translations as you wish.

?s	?lang1	?lang2
<http: 0000001="" bfo="" obo="" purl.obolibrary.org=""></http:>	entity	
<http: bfo_0000002="" obo="" purl.obolibrary.org=""></http:>	continuant	
<http: bfo_0000016="" obo="" purl.obolibrary.org=""></http:>	disposition	
<http: bfo_0000017="" obo="" purl.obolibrary.org=""></http:>	realizable entity	
<http: 0000020="" bfo="" obo="" purl.obolibrary.org=""></http:>	specifically dependent continuant	
<http: bfo_0000031="" obo="" purl.obolibrary.org=""></http:>	generically dependent continuant	
< http://purl.obolibrary.org/obo/LANG 0000001>	Language	langue
< http://purl.obolibrary.org/obo/LANG 0000002>	ISO 639-1 Code	
<http: lang_0000003="" obo="" purl.obolibrary.org=""></http:>	ISO 639-2T Code	
<http: lang_0000004="" obo="" purl.obolibrary.org=""></http:>	ISO 639-2B Code	
< http://purl.obolibrary.org/obo/LANG_0000005>	ISO 639-3 Code	
< http://purl.obolibrary.org/obo/LANG 0000006>	ISO 639 Language Scope	
< http://purl.obolibrary.org/obo/LANG_0000007>	ISO 639 Language Type	
<http: lang_0000008="" obo="" purl.obolibrary.org=""></http:>	ISO 639 Language Comment	
<http: lang_0000009="" obo="" purl.obolibrary.org=""></http:>	Language Capability	compétence langagière
<http: lang_0000010="" obo="" purl.obolibrary.org=""></http:>	CEFR Global Scale Proficient User Capability	CECRL : une capacité d'utilisation efficace à l'échelle m
<http: lang_0000011="" obo="" purl.obolibrary.org=""></http:>	CEFR Global Scale Proficient User C2 Capability	CECRL : une capacité d'utilisation efficace à l'échelle m
< http://purl.obolibrary.org/obo/LANG 0000012>	CEFR Global Scale Proficient User C1 Capability	CECRL : une capacité d'utilisation efficace à l'échelle m
< http://purl.obolibrary.org/obo/LANG 0000013>	CEFR Global Scale Independent User Capability	CECRL Capacité d'utilisation indépendante à l'échelle n
<http: lang_0000014="" obo="" purl.obolibrary.org=""></http:>	CEFR Global Scale Independent User B2+ Capability	CECRL Capacité d'utilisation indépendante à l'échelle n
<http: lang_0000015="" obo="" purl.obolibrary.org=""></http:>	CEFR Global Scale Independent User B2 Capability	CECRL Capacité d'utilisation indépendante à l'échelle n
< http://purl.obolibrary.org/obo/LANG 0000016>	CEFR Global Scale Independent User B1+ Capability	CECRL Capacité d'utilisation indépendante à l'échelle n
< http://purl.obolibrary.org/obo/LANG 0000017>	CEFR Global Scale Independent User B1 Capability	CECRL Capacité d'utilisation indépendante à l'échelle n
<http: lang_0000018="" obo="" purl.obolibrary.org=""></http:>	CEFR Global Scale Basic User Capability	CECRL Échelle globale Capacité de base de l'utilisateur
<http: lang_0000019="" obo="" purl.obolibrary.org=""></http:>	CEFR Global Scale Basic User A2+ Capability	CECRL Échelle globale Capacité de base de l'utilisateur
<http: lang_0000020="" obo="" purl.obolibrary.org=""></http:>	CEFR Global Scale Basic User A2 Capability	CECRL Échelle globale Capacité de base de l'utilisateur
< http://purl.obolibrary.org/obo/LANG 0000021>	CEFR Global Scale Basic User A1 Capability	CECRL Échelle globale Capacité de base de l'utilisateur
<http: lang_1000001="" obo="" purl.obolibrary.org=""></http:>	Alumu-Tesu	
<http: lang_1000002="" obo="" purl.obolibrary.org=""></http:>	Ari	
<http: lang_1000003="" obo="" purl.obolibrary.org=""></http:>	Amal	
<http: lang_1000004="" obo="" purl.obolibrary.org=""></http:>	Arbëreshë Albanian	
<http: lang_1000005="" obo="" purl.obolibrary.org=""></http:>	Aranadan	
<http: lang_1000006="" obo="" purl.obolibrary.org=""></http:>	Ambrak	

Step 3 — Put Text

Use file from step 2 in put-text.py

put-text fr translate-enfr.tsv lang.owl new-lang.owl

put-text reads the spreadsheet of translations, creates assertions, and merges them into an ontology to create a new ontology containing the translations

