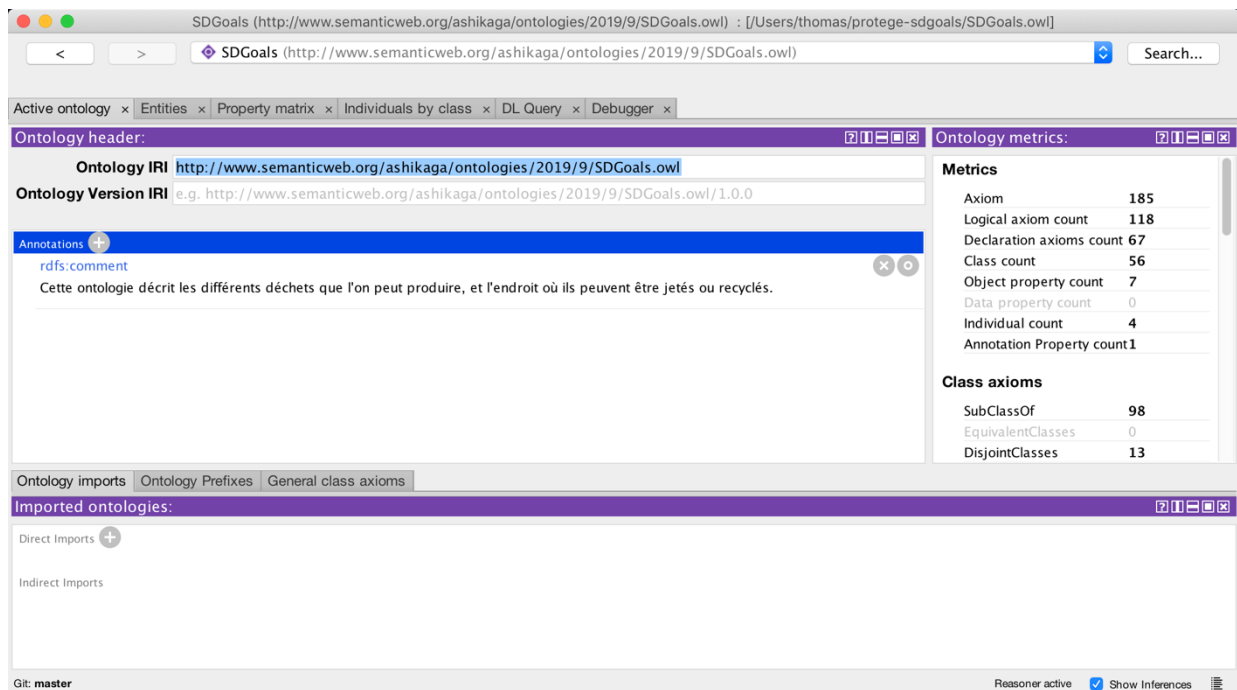


# Easy waste sorting with an ontology

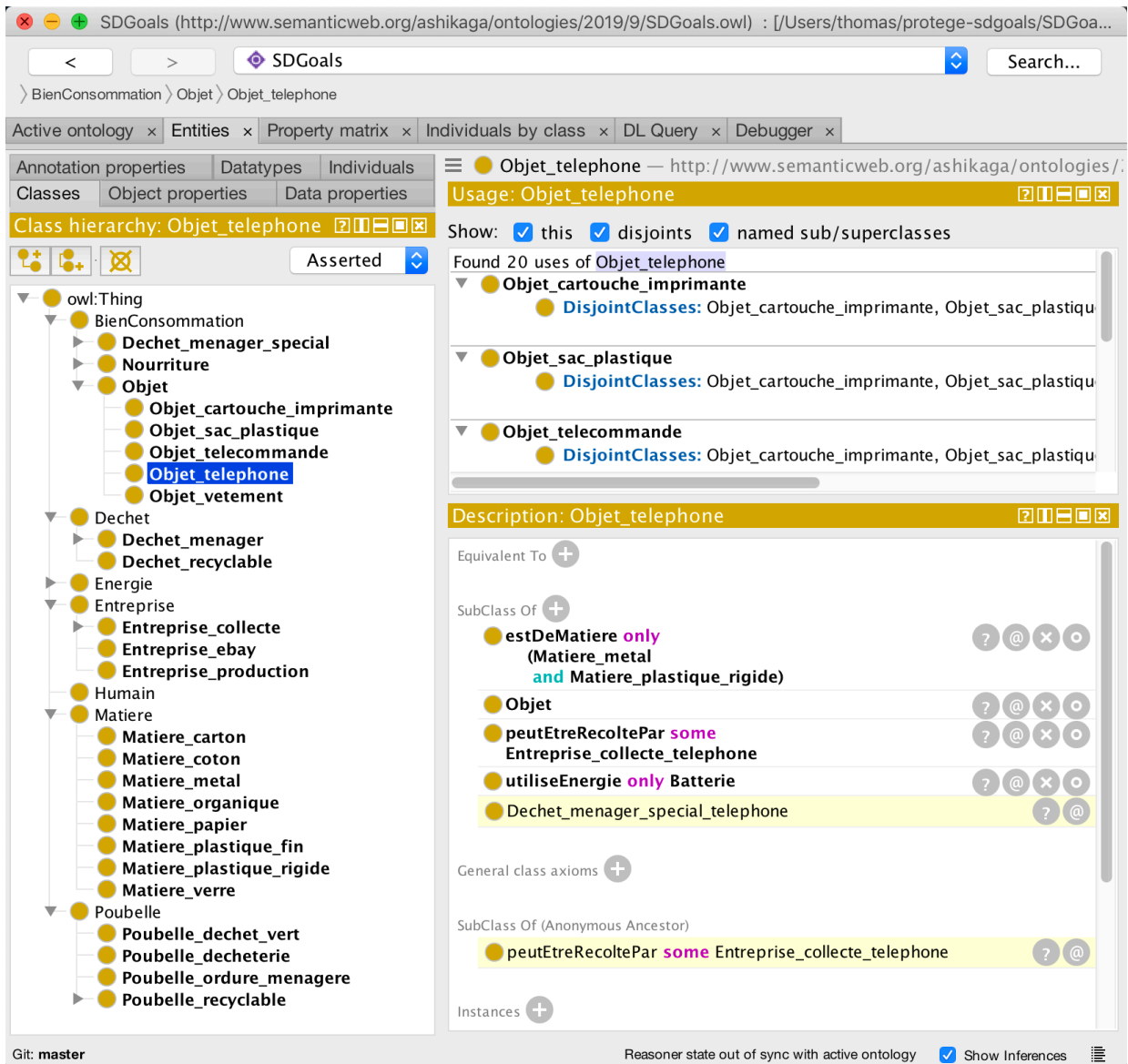
Cyril CHHUN, Thomas DAHMEN



Repo : <https://github.com/lashoun/protege-sdgoals>

# Presentation of the ontology

Our ontology aims at helping the user to sort his waste efficiently. The goal is to maximize waste recycling, and thus engage the user into a sustainable development action.



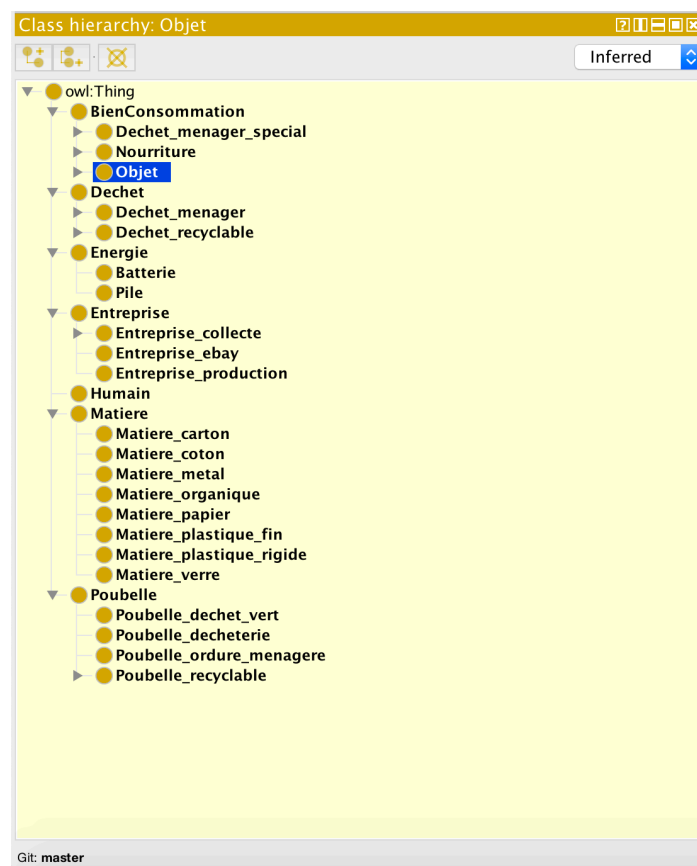
The class **BienConsommation** identifies consumption goods such as food (**Nourriture**) or Items (**Objet**). Some items need a source of energy, this relation is ensured by the object property **utiliseEnergie**. For example, **Objet\_telephone** has the restriction *utiliseEnergie only Batterie*, this means that a phone contains a battery and we must take this into account when recycling.

Each **Object** is made of a specific material (class **Matiere**), such as wood, paper, plastic... This relation is set with the object property **estDeMatiere** (for example, **Objet\_telephone** is made of metal and rigid plastic in this ontology). Moreover, each material produces a specific type of **Dechet**, described by the object property **produitDechet**. The class **Dechet** identifies types of waste (recyclable or not, with sub categories). Each type of **Dechet** has to be thrown away in a

specific trash can to ensure that waste sorting is done properly. This goal is achieved by the object property **peutEtreJeteDans**, which takes an instance of **Matiere** into an instance of **Poubelle**. The latter class defines the different types of trash can (recyclable, green waste...).

However, some waste cannot be thrown away in a trash can. For example, phones (**Objet\_telephone**) and printer cartridge (**Objet\_cartouche\_imprimante**) must be collected by specific companies. This is done with the object property **peutEtreRecoltePar** the class **Entreprise** and its subclass **Entreprise\_collecte** which contains companies that can collect cartridge, phones or light bulbs. We have also added a class for Ebay (**Entreprise\_ebay**), since one may want to sell old but still working items.

## Results



The reasoner does not detect any inconsistencies / incoherencies.

The inferred class hierarchy is consistent with the asserted one.

For example, when asked about a wine bottle, the ontology suggests us to throw it away in a “recyclable glass” specific trash can

## Ontology facts (MIRO)

- **A.1 Ontology name:** Easy waste sorting (EWS), v1.0
- **A.2 Ontology owner:** Cyril CHHUN, Thomas DAHMEN
- **A.3 Ontology license:** Creative Commons Attribution 3.0
- **A.4 Ontology URL:** <https://github.com/lashoun/protege-sdgoals/blob/master/SDGoals.owl>
- **A.5 Ontology repository:** <https://github.com/lashoun/protege-sdgoals/>
- **A.6 Methodological framework:** None
  
- **B.1 Need:** Allow people to sort their waste easily
- **B.2 Competition:** None
- **B.3 Target audience:** Individuals
  
- **C.1 Scope and coverage:** Individuals from the EU
- **C.2 Development community:** Cyril CHHUN, Thomas DAHMEN
- **C.3 Communication:** <https://github.com/lashoun/protege-sdgoals/issues>
  
- **D.1 Knowledge acquisition methodology:** Sustainable development rules from the EU
  
- **E.1 Knowledge Representation language:** OWL version 2
- **E.2 Development environment:** Protégé 5.5.0
- **E.4 Incorporation of other ontologies:** None
- **E.5 Entity naming convention:** Begins with parent class name
- **E.6 Identifier generation policy:** None
- **E.7 Entity metadata policy:** Natural language name
- **E.8 Upper ontology:** None
- **E.9 Ontology relationship:** None
- **E.10 Axiom patterns:** None
  
- **F.1 Sustainability plan:** The ontology will be maintained according to reported issues
- **F.2 Entity deprecation strategy:** None
- **F.3 Versioning policy:** None
  
- **G.1 Testing:** Successfully classified by Hermit 1.4.3.456 in less than 1 second
- **G.2 Evaluation:** The ontology can be use for everyday use items
- **G.3 Example of use:** When asked about a wine bottle, the ontology suggests us to throw it away in a “recyclable glass” specific trash can