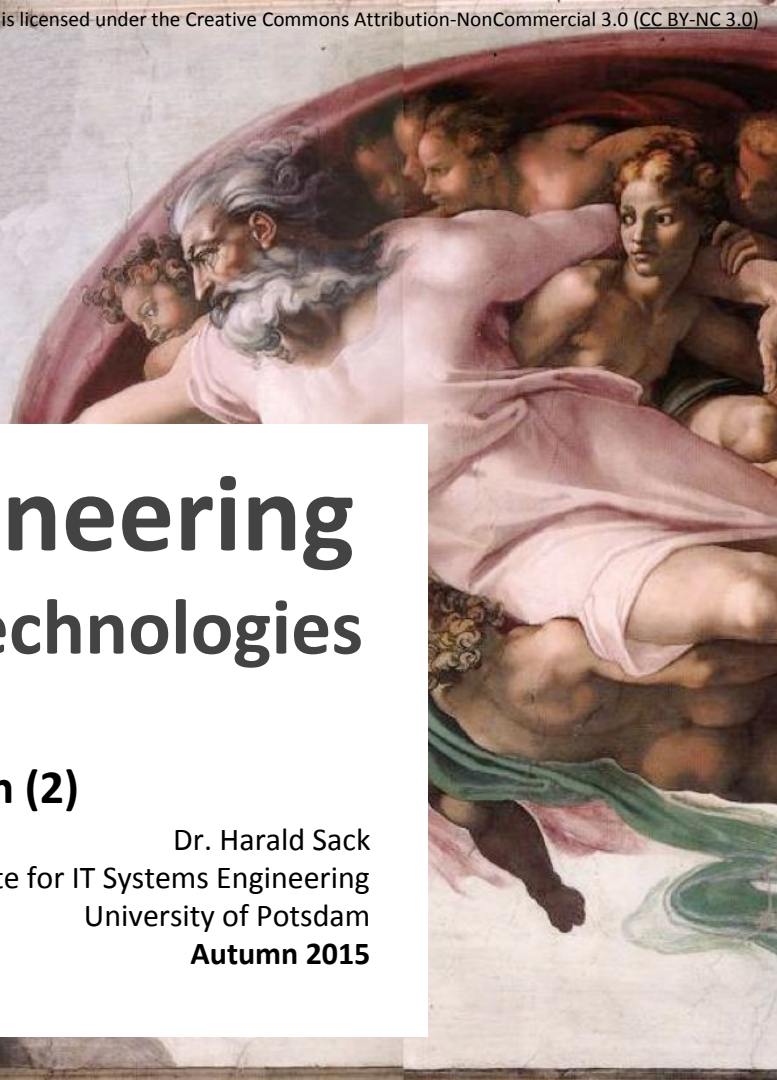
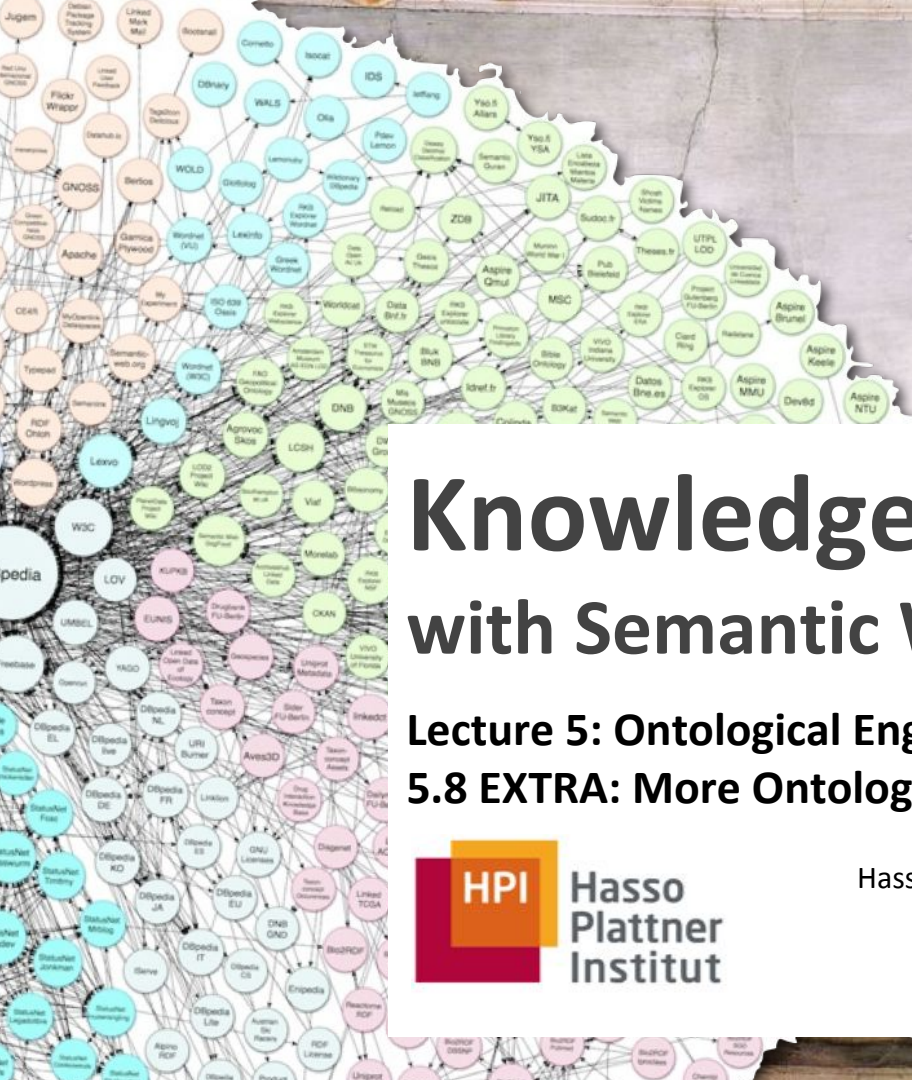




Knowledge Engineering with Semantic Web Technologies

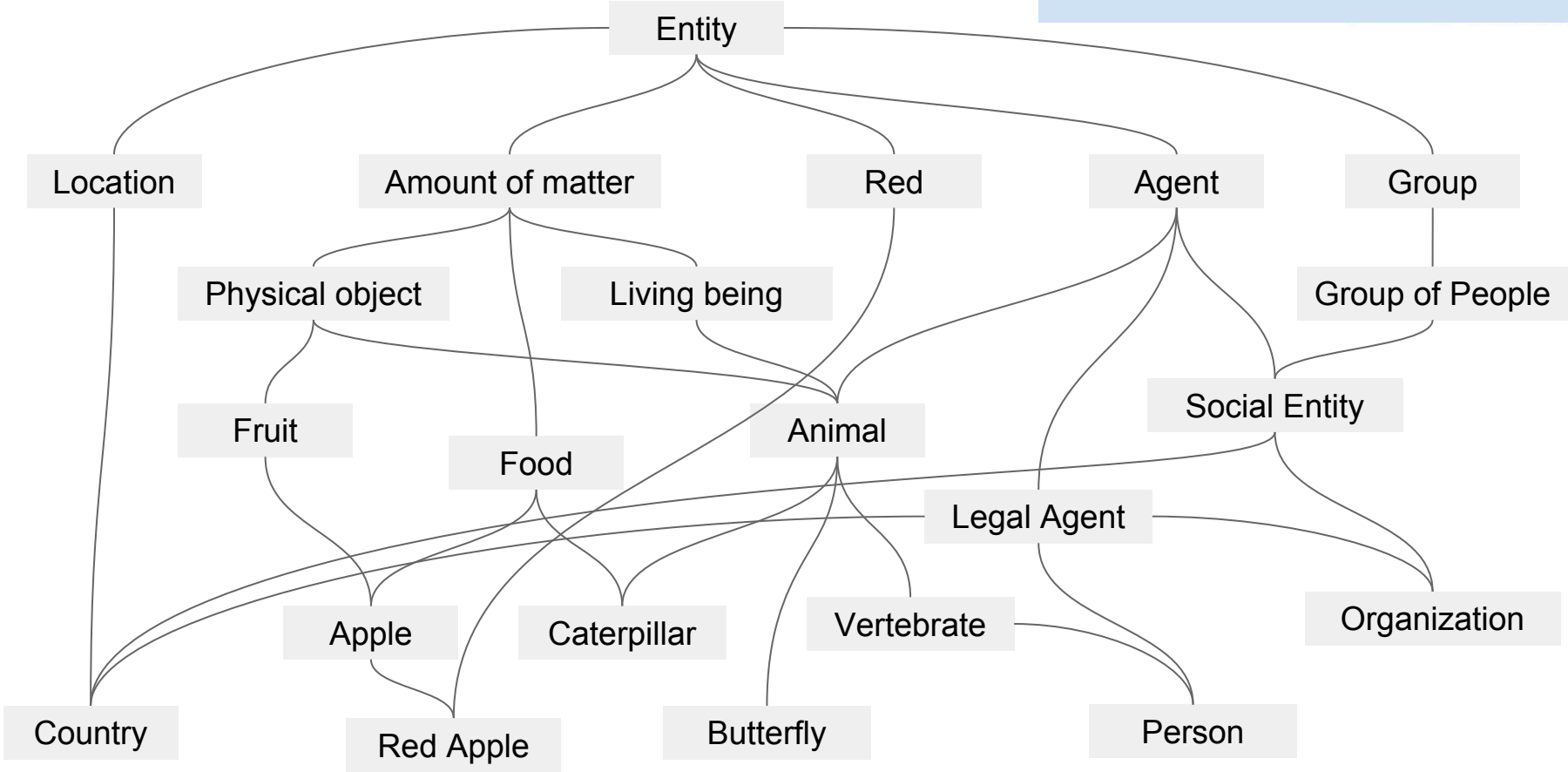
Lecture 5: Ontological Engineering 5.8 EXTRA: More Ontology Evaluation (2)



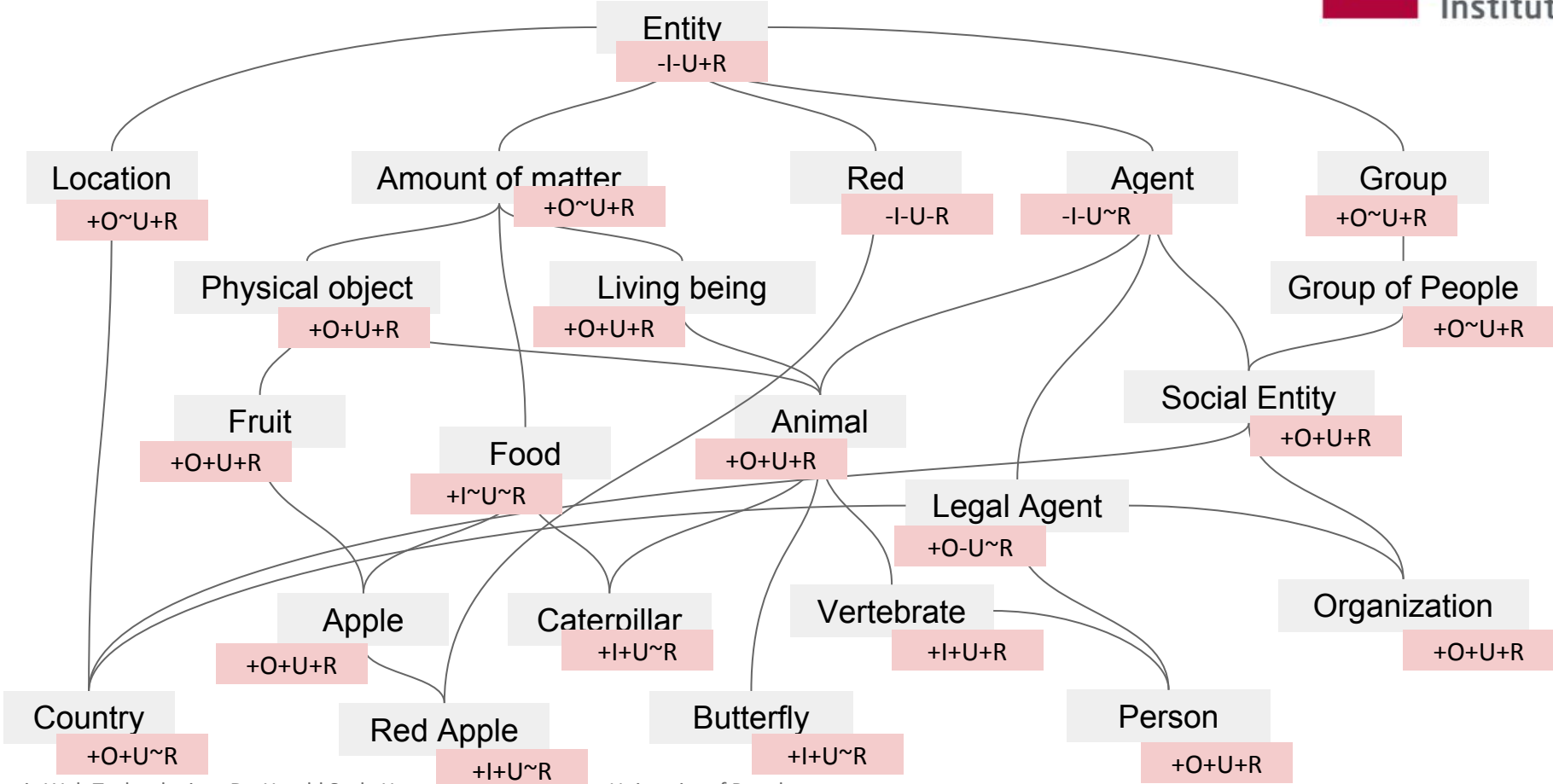
Dr. Harald Sack
Hasso Plattner Institute for IT Systems Engineering
University of Potsdam
Autumn 2015

OntoClean Example

1. Annotate the Taxonomy



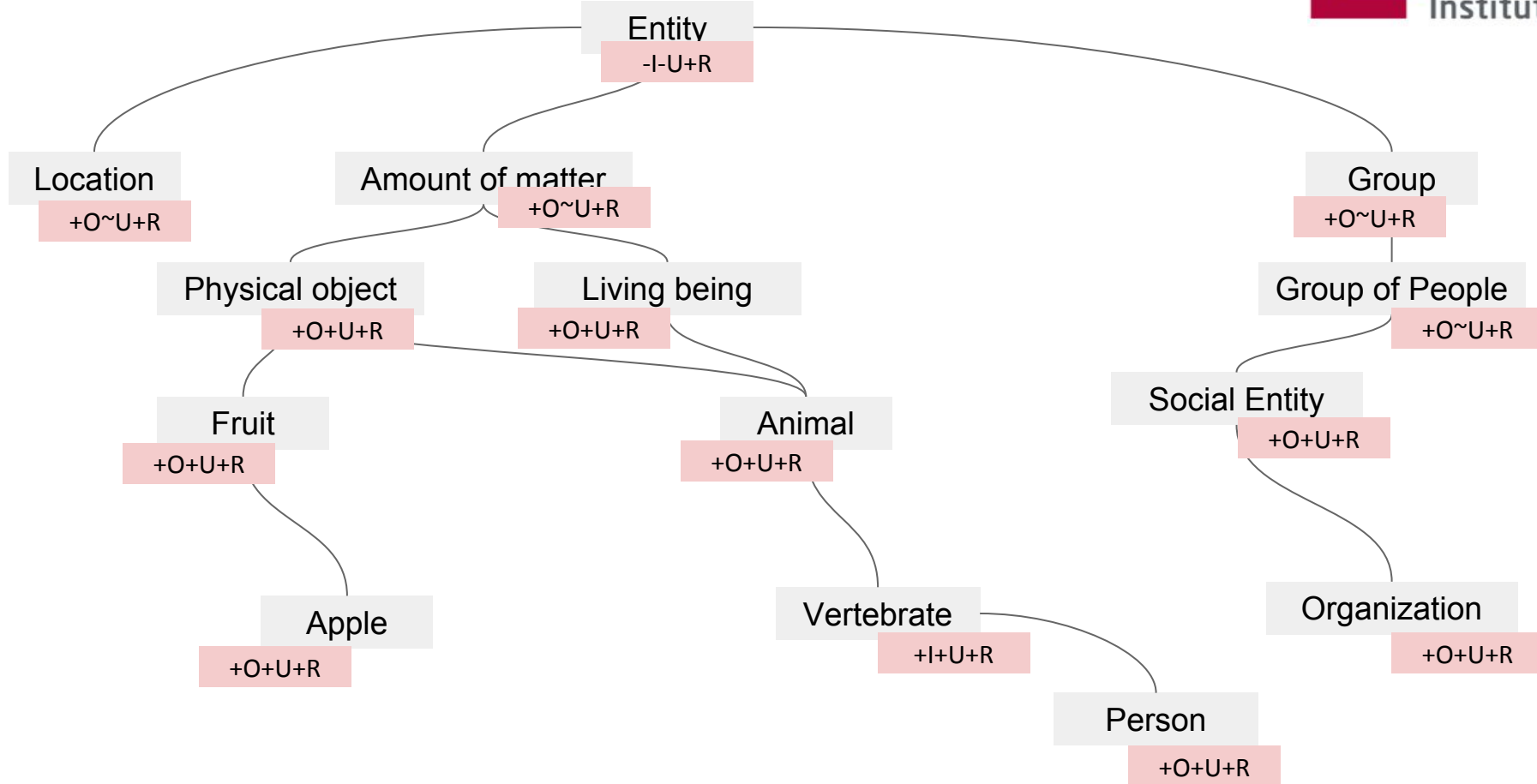
OntoClean Example



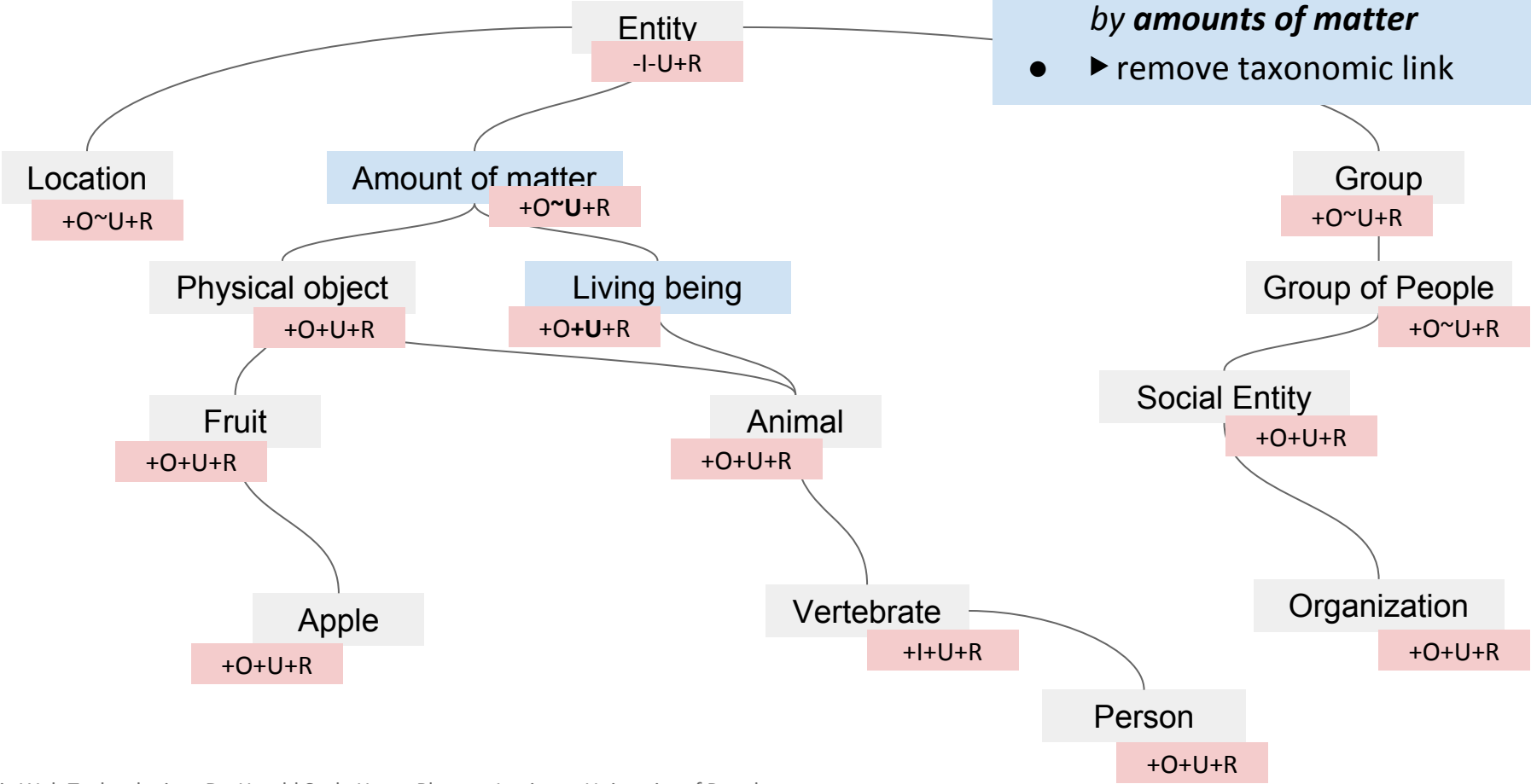
OntoClean Example

1. Focus on **Backbone Taxonomy** built up by rigid properties
 - rigid properties represent invariant aspects of the domain
2. **Verify** whether **constraints** on meta-properties are violated
3. If a **violation** is encountered
 - either **reconsider meta-properties**,
 - or **reconsider the taxonomic link**

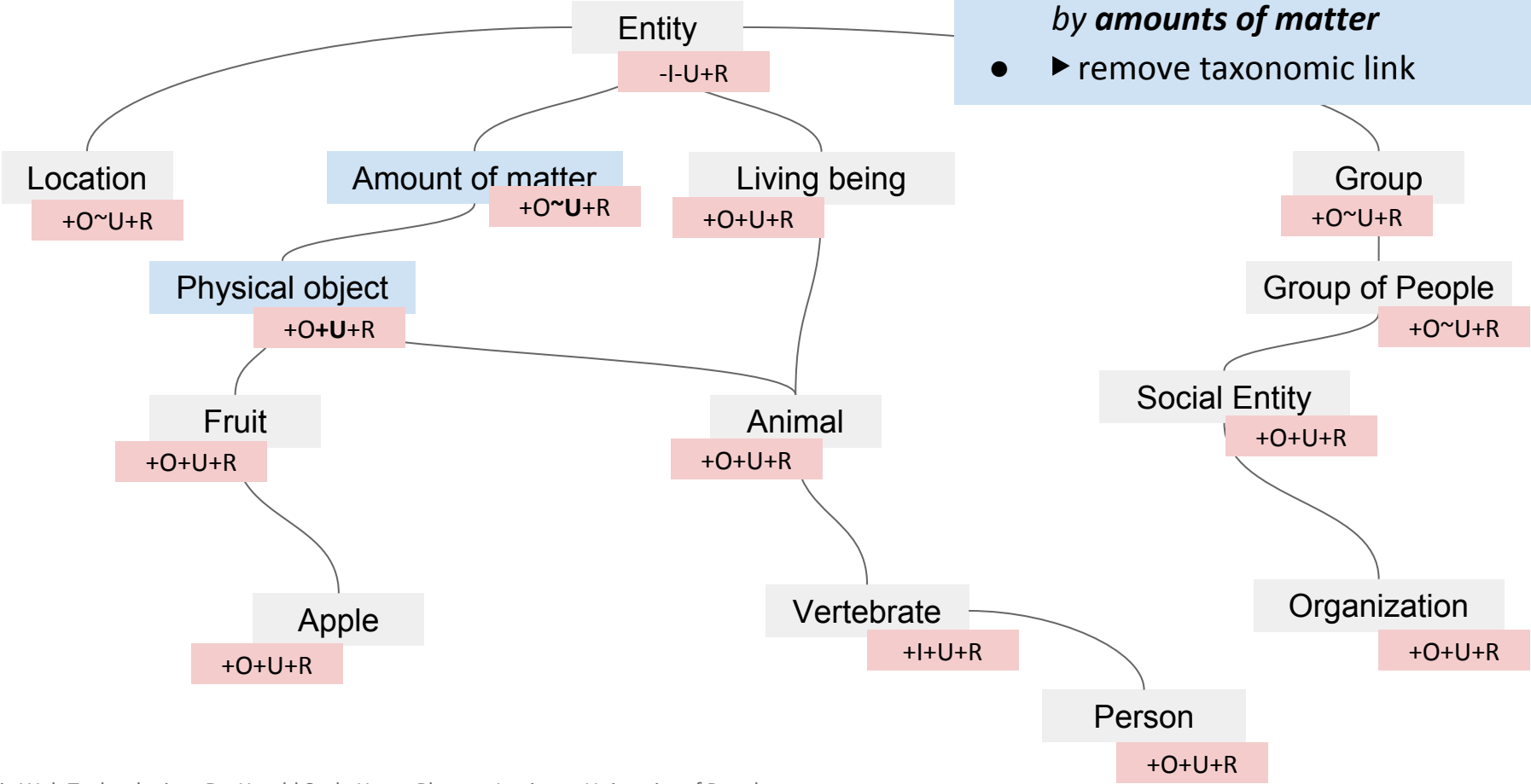
Backbone Taxonomy



Backbone Taxonomy

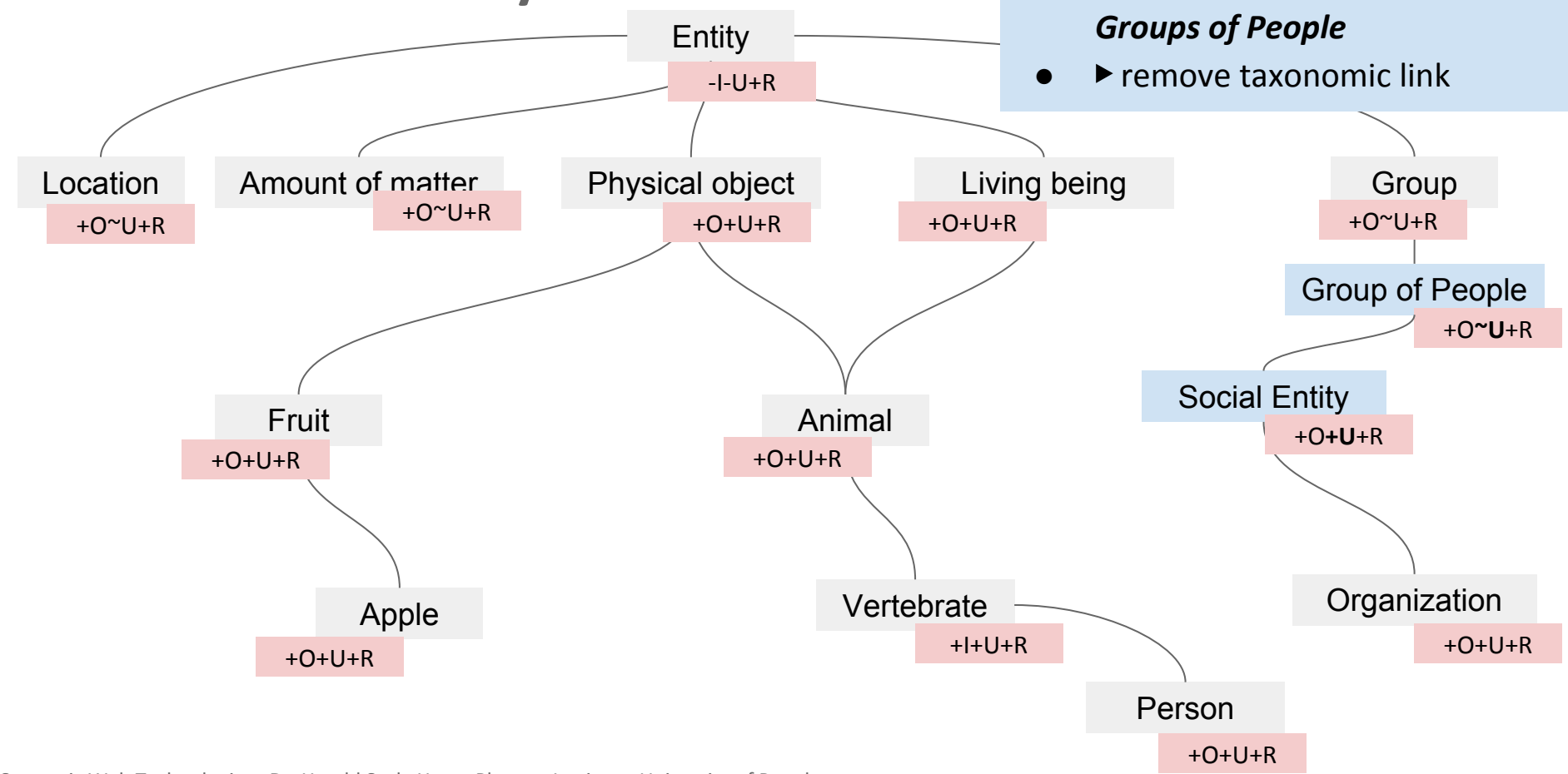


Backbone Taxonomy

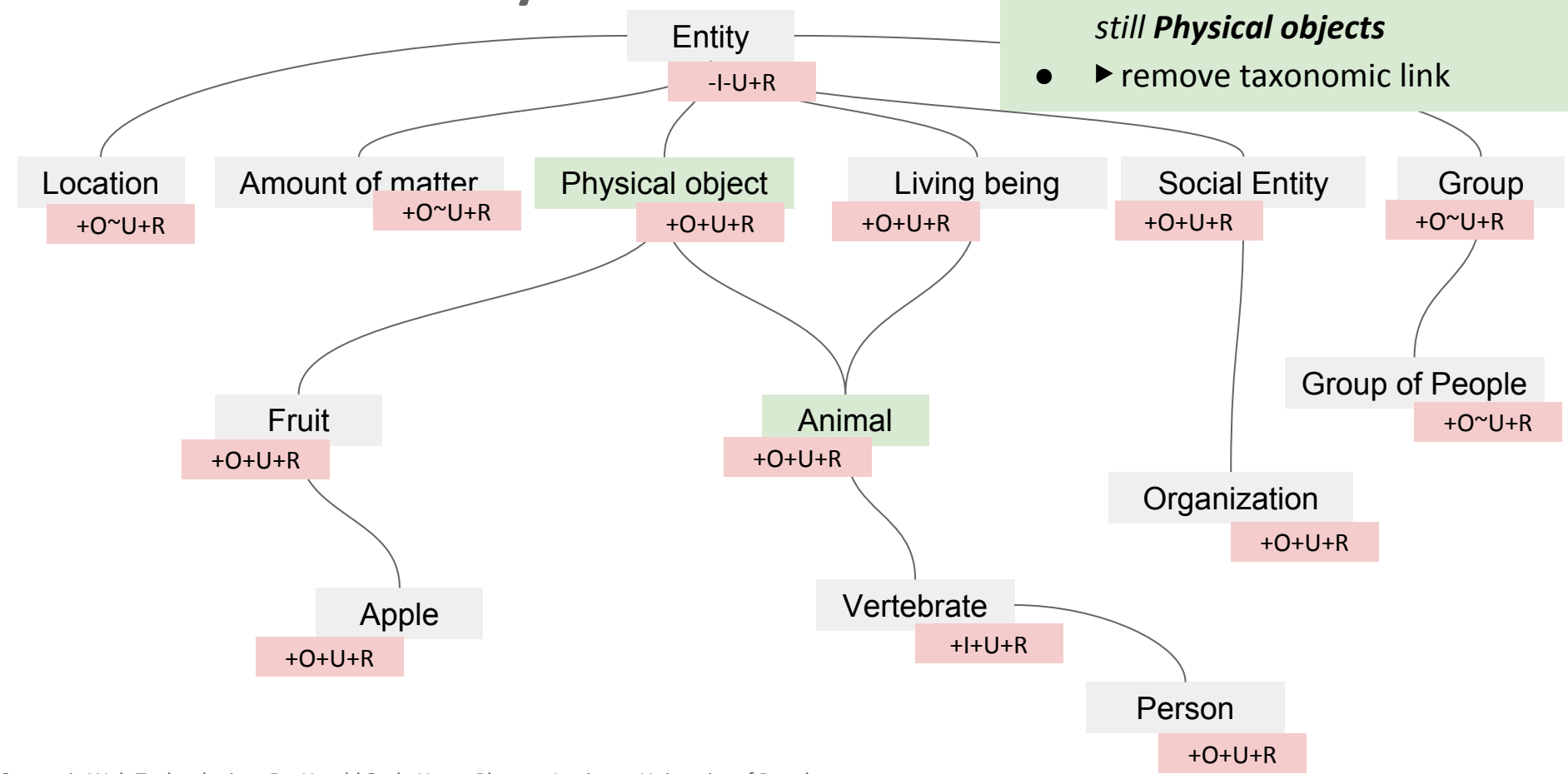


- ~U cannot subsume +U
- **Physical objects** are constituted by **amounts of matter**
- ► remove taxonomic link

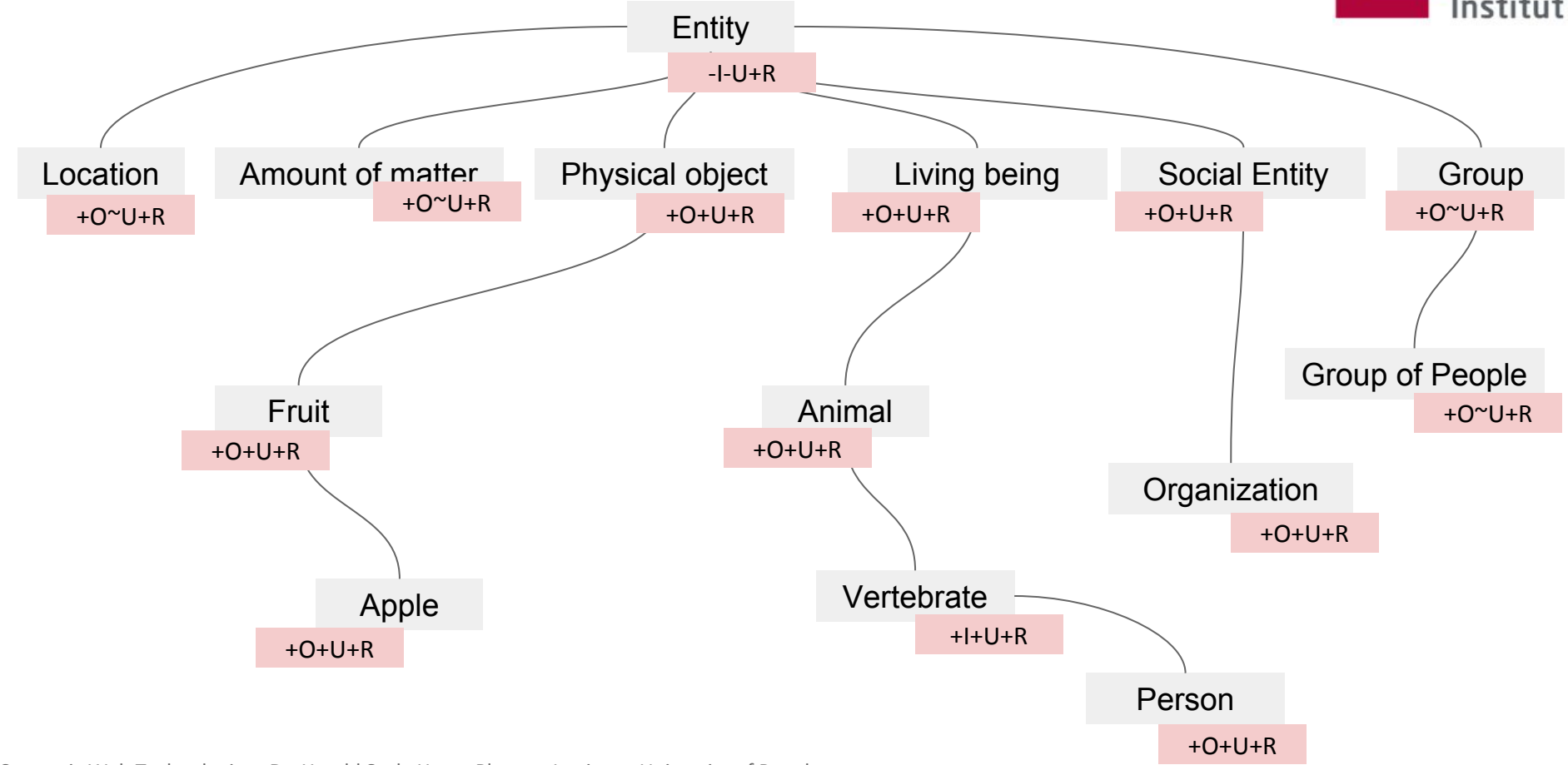
Backbone Taxonomy



Backbone Taxonomy

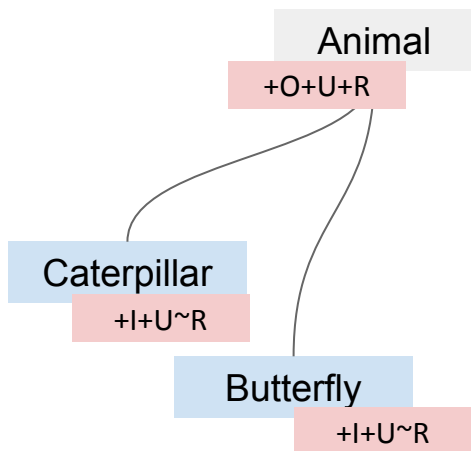


Cleaned Backbone Taxonomy



OntoClean Example

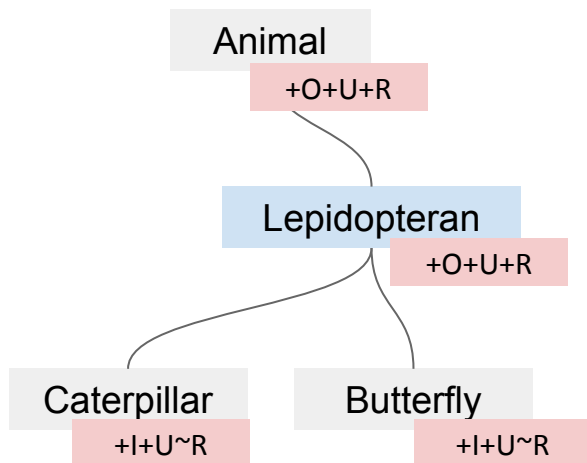
- Next, focus on **non-rigid properties**
 - **phased sortals**
 - property whose instances are allowed to change certain of their identity criteria during their existence, while remaining the same entity
 - are independent (-D), anti-rigid ($\sim R$), and supply identity criteria (+I)



- There is no property that subsumes the two phases of the same entity
- ► create new property that subsumes the two phases as **Lepidopteran** (+O+U+R)

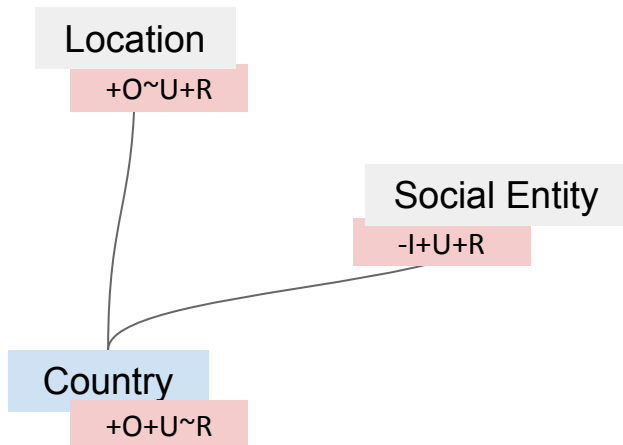
OntoClean Example

- Next, focus on **non-rigid properties**
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 - are independent (-D), anti-rigid ($\sim R$), and supply identity criteria (+I)



OntoClean Example

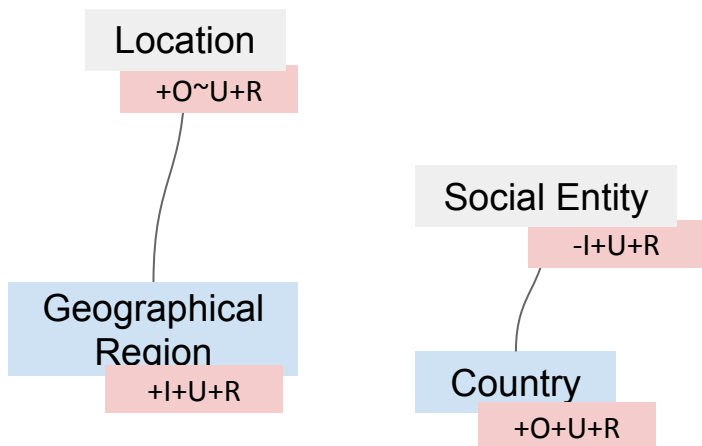
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 - **phased sortals**
 - property whose instances are allowed to change certain of their identity criteria during their existence, while remaining the same entity
 - are independent (-D), anti-rigid ($\sim R$), and supply identity criteria (+I)



- **Country** may be considered a **Geographical Region** (related to **Location**) or a **Societal Entity**
- The **Societal Entity** might stay the same, while the **Geographical Region** changes over time
- ▶ create new property **Geographical Region** (+I-U+R) to separate the two meanings
- ▶ change characteristics of **Country** accordingly (+O+U+R)

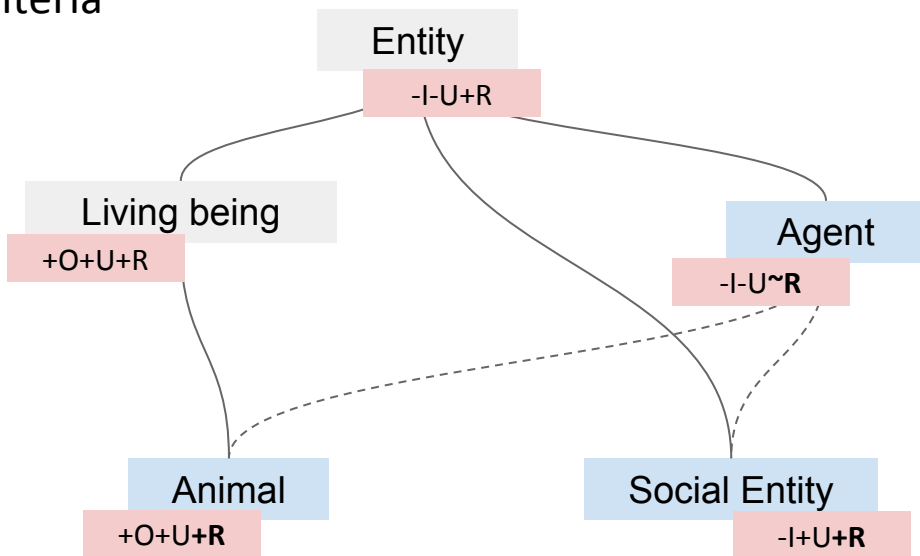
OntoClean Example

- Next, focus on **non-rigid properties**
 - **phased sortals**
 - property whose instances are allowed to change certain of their identity criteria during their existence, while remaining the same entity
 - are independent (-D), anti-rigid ($\sim R$), and supply identity criteria (+I)



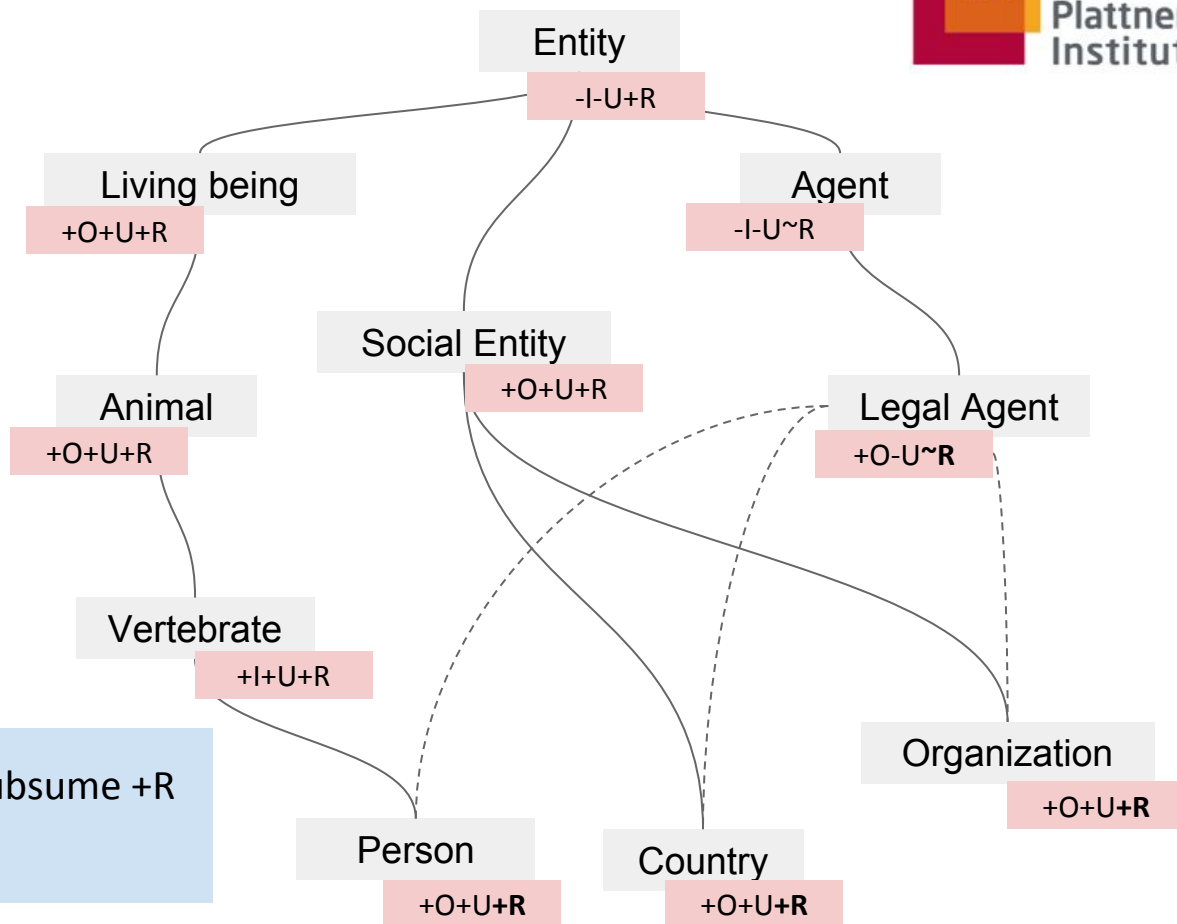
OntoClean Example

- Next, focus on **non-rigid properties**
 - **Roles**
 - properties that characterize the way something participates to a contingent event or state of affairs
 - roles do not supply identity criteria



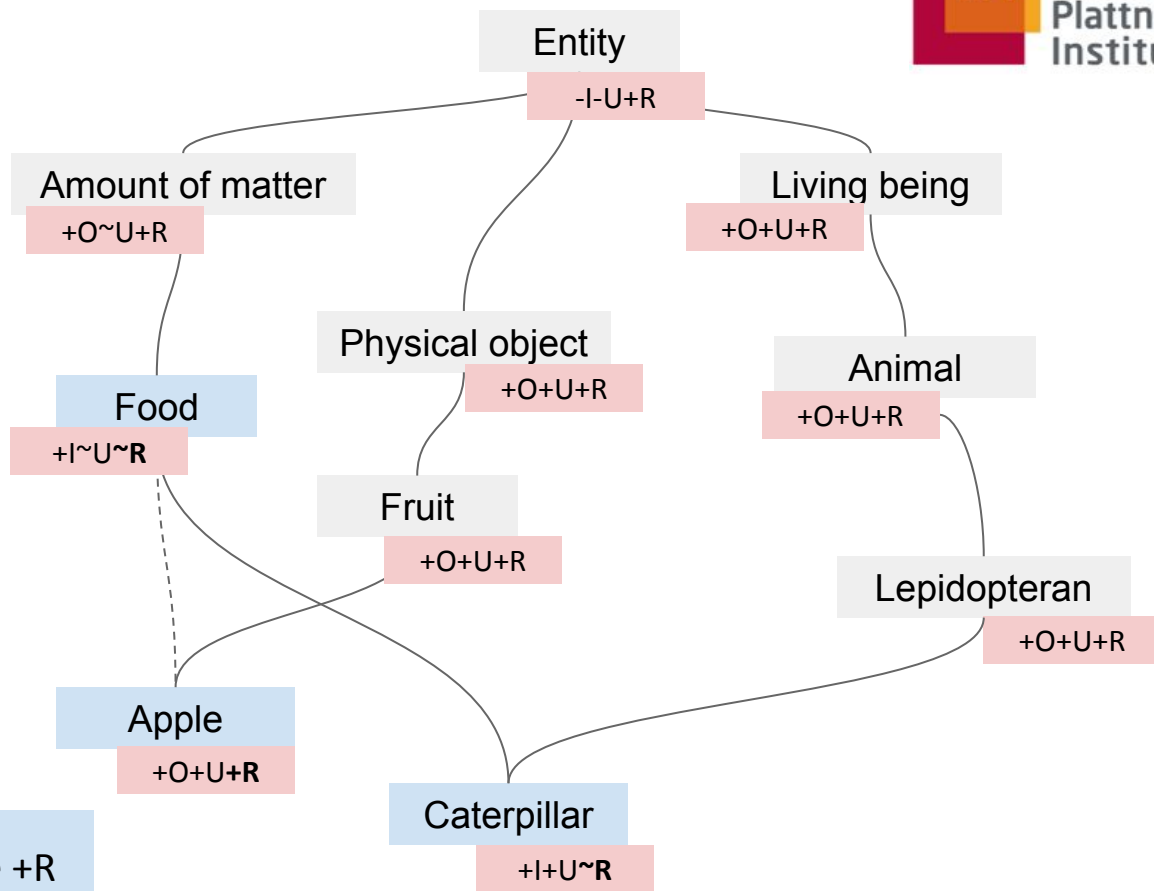
- Rule violation: $\sim R$ cannot subsume $+R$
- ► remove taxonomic links

OntoClean Example



- Rule violation: $\sim R$ cannot subsume $+R$
- ► remove taxonomic links

OntoClean Example

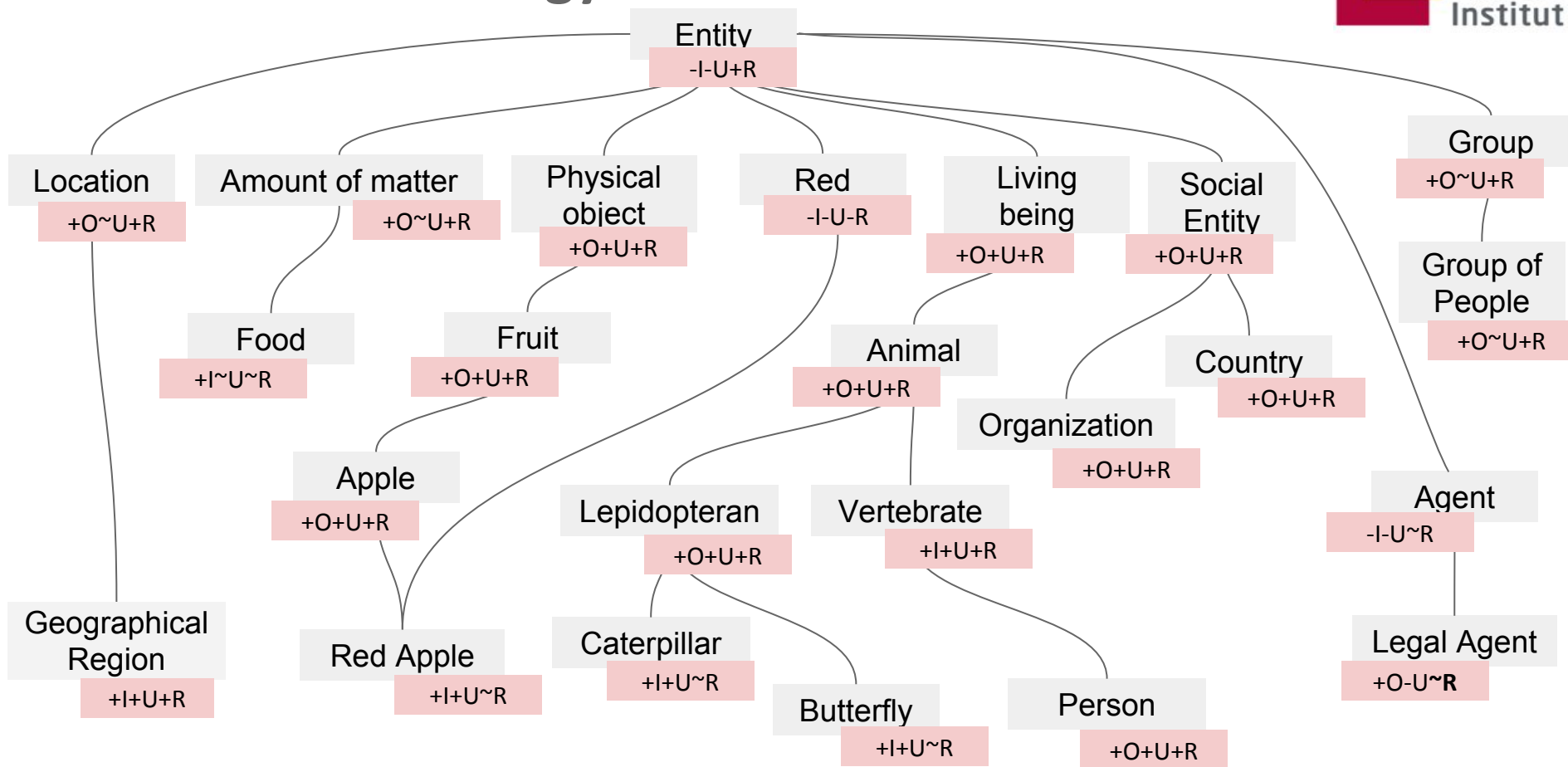


- Rule violation: $\sim R$ cannot subsume $+R$
- ► remove taxonomic links

OntoClean Example

- Next, focus on **non-rigid properties**
 - **Attributions**
 - attributions (as e.g. Red) should not necessarily be represented explicitly in a general taxonomy
 - proper way to represent attributions is via a simple attribute (e.g. via color)
 - however, attributions might come handy on occasions (dependent on intended purpose of the ontology)

Final Cleaned Ontology



- **References:**

- Nicola Guarino and Christopher Welty. 2002. Evaluating ontological decisions with OntoClean. Commun. ACM 45, 2 (February 2002), pp. 61-65.
([download .pdf](#) from citeseer)
- Nicola Guarino and Chris Welty. 2009, An Overview of OntoClean, in Handbook on ontologies, pp. 201-220.
([download .pdf](#) from Uni Leipzig)



OpenHPI - Course Knowledge Engineering with Semantic Web Technologies

Lecture 6: Knowledge Engineering