Ontology Mapping

To addresses the *ontology silo problem*,
an extension of the *data silo problem*.

AGLDWG Plenary Meeting Presentation
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Presentation Topics

1. Q. What are the *data silo* & *ontology silo* problems?
2. Q. What is an Ontology Mapping?
3. Q. Relevance to AGLDWG?
4. Q. Relevant to LD & Australia's National Security?
5. What I'm seeking to do.
6. The (first) ontology mapping I wish to prosecute.

1. Q. What are the *data silo* & *ontology silo* problems?

The *data silo problem* is the problem of having data stored in isolated databases all of which are organized according to independent schemes [2]. Data sets in different data silos are not interoperable. Ontologies are well-structured vocabularies that logically define classes and relationships in the interest of promoting interoperability [3]. A popular way to construct ontologies, and the way relevant to this paper, is by leveraging the W3C standard Web Ontology Language (OWL) [4]. Data sets become more semantically interoperable when interpreted by the same OWL ontology into a *knowledge graph*. While ontologies are a promising strategy for remedying the data silo problem, the proliferation of ontologies in a domain may lead to larger ontology silos. The *ontology silo problem* is the problem of having data organized by independent ontologies. Although a data set organized within an ontology is internally interoperable, different data sets organized by independent ontologies are not mutually interoperable. One solution is to create mappings between terms in ontologies of interest.

Source:
https://www.arxiv.org/abs/2408.03866

2. Q. What is an Ontology Mapping?

An *ontology mapping* is a RDF triple statement <*s*, *p*, *o*> such that:

- '*s*' (subject) representing a class or object property in a ontology,

- '*o*' (object) representing a class or object property in some other ontology, and

- '*p*' (predicate) specifies how s and o relate.

Source: https://www.arxiv.org/pdf/2408.03866#page=1

3. Q. Relevance to AGLDWG?

Ontology mapping is a U.S. Gov. endorsed approach to addressing the *ontology silo problem*.

Top Level Ontology: Basic Formal Ontology (BFO)

Mid Level Ontologies:

- Common Core Ontologies (CCO) Suite,
- Industrial Ontologies Foundry (IOF), and
- Open Biomedical and Biomedical Ontologies (OBO) Foundry.

4. Q. Relevant to LD & Australia's National Security?

Both BFO and CCO have been directed for use as "baseline standards" for formal ontology development across the United States Department of Defense and Intelligence Community.

Source: https://github.com/CommonCoreOntology/CommonCoreOntologies/tree/develop?tab=readme-ov-file#what-is-cco

5. What I'm seeking to do

1. Work with others with greater (technical) LD skills than I & see the importance of this.
2. Use PROV-O in a disciplined & repeatable way to compare:
   a. "*Mapping the Provenance Ontology to Basic Formal Ontology*" by T. Prudhomme, et al (Submitted 2Aug2024) https://www.arxiv.org/pdf/2408.03866, and
   b. "*Mapping the W3C Provenance Ontology (PROV-O) to the Basic Formal Ontology (BFO): Epistemological Considerations and Preliminary Implementation*" by T. Procko & O. Ochoa (Jan2024) http://dx.doi.org/10.2139/ssrn.4852748.
3. Generate a disciplined mapping between:
   a. the Resource Event Agent (REA) Ontology https://www.williamemccarthy.com/s/REA-Monograph-v090-2019-by-McCarthy-Geerts-and-Gal.pdf,
   b. Basic Formal Ontology (BFO) https://github.com/BFO-ontology/BFO-2020, and
   c. (where required) Common Core Ontologies (CCO) Suite https://github.com/CommonCoreOntology/CommonCoreOntologies/tree/develop.

6. The (first) ontology mapping I wish to prosecute

<*s*, *p*, *o*>

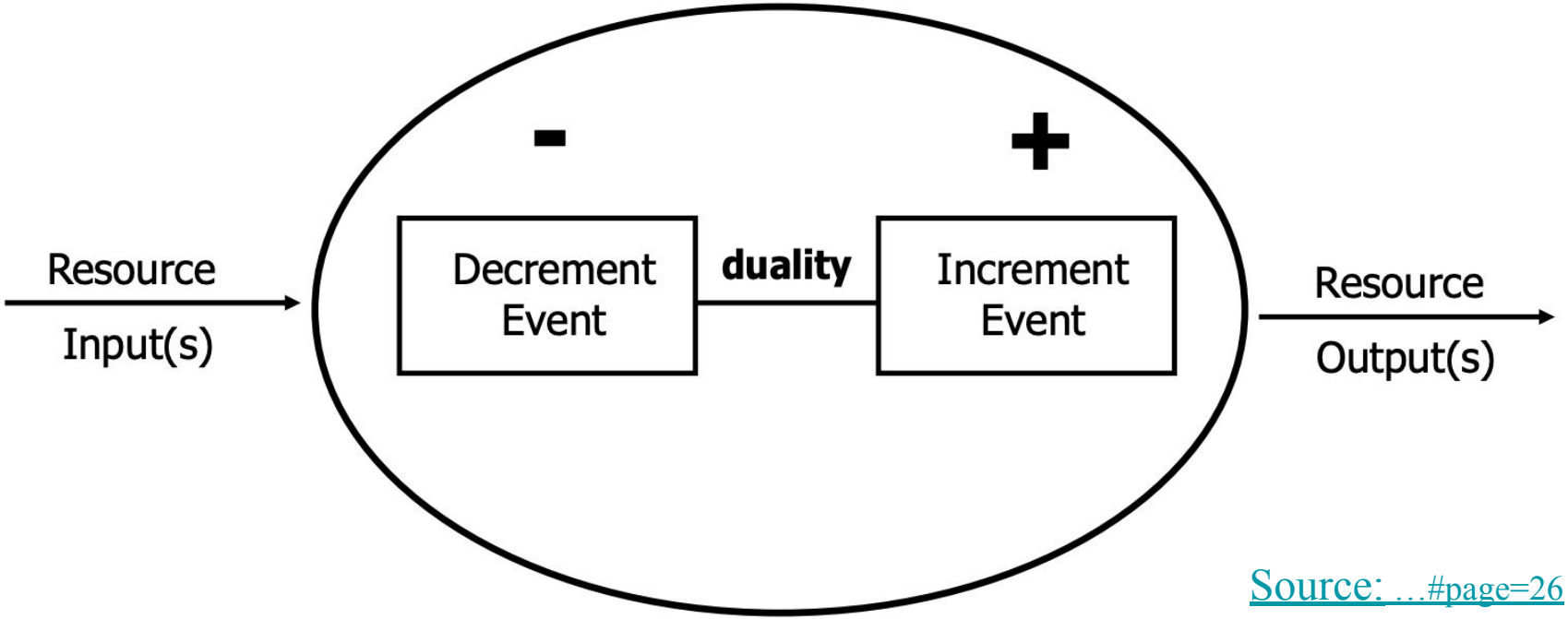
s = REA:BusinessProcess
https://www.williamemccarthy.com/s/REA-Monograph-v090-2019-by-McCarthy-Geerts-and-Gal.pdf#page=32

p = RDFS:subClassOf
https://www.w3.org/TR/rdf11-schema/#ch_subclassof

o = BFO:Process
http://purl.obolibrary.org/obo/BFO_0000015

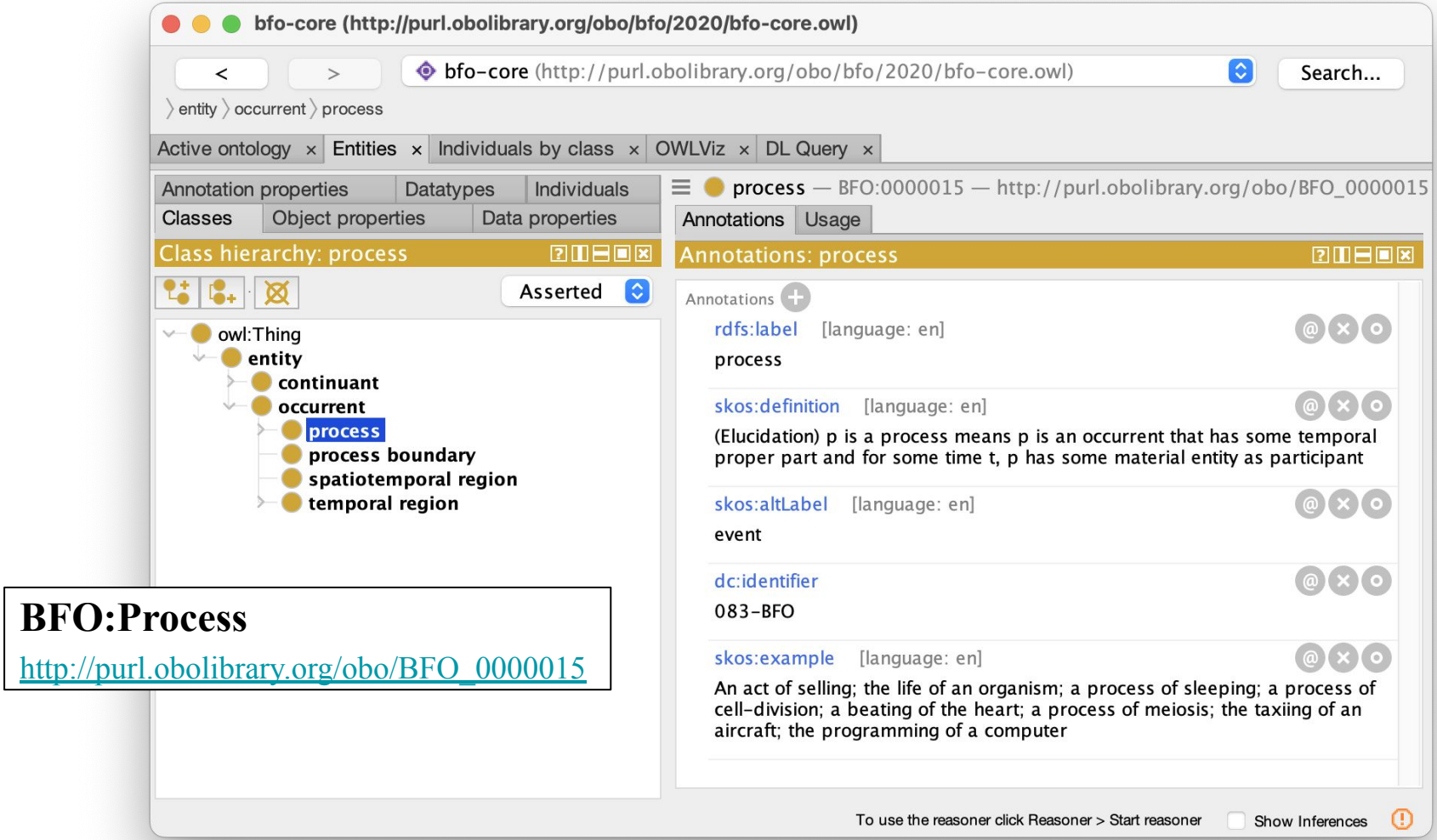
REA:BusinessProcess

https://www.williamemccarthy.com/s/REA-Monograph-v090-2019-by-McCarthy-Geerts-and-Gal.pdf#page=32



Source: …#page=26

REA Shorthand Business Process Notation



BFO:Process

http://purl.obolibrary.org/obo/BFO_0000015