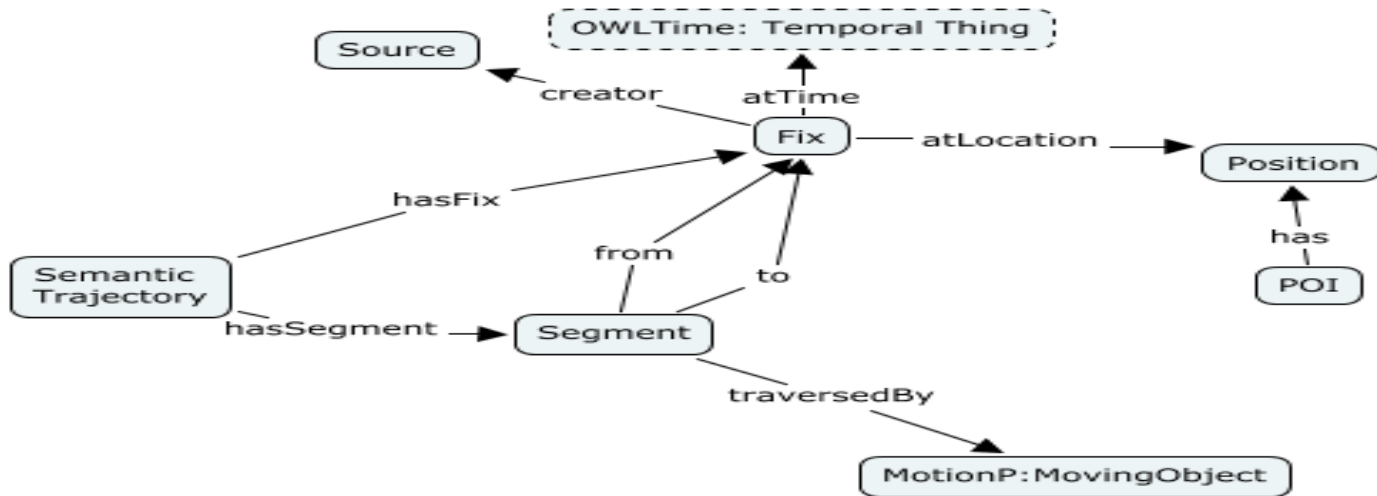


A Few Words about Ontology Design Patterns (ODPs) & Modular Ontologies

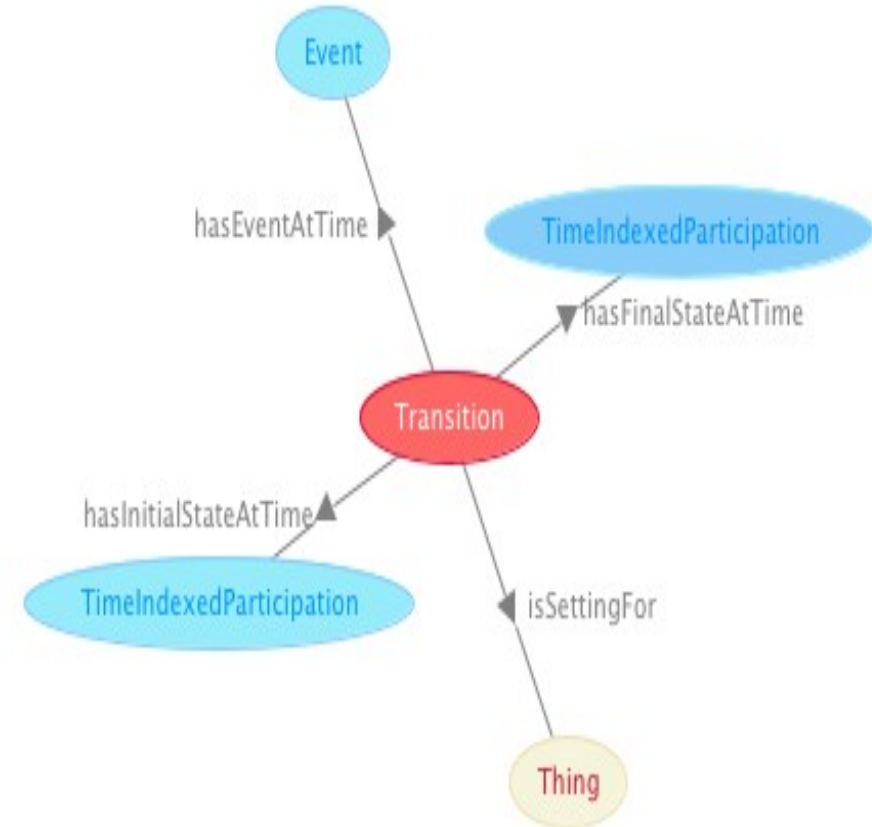
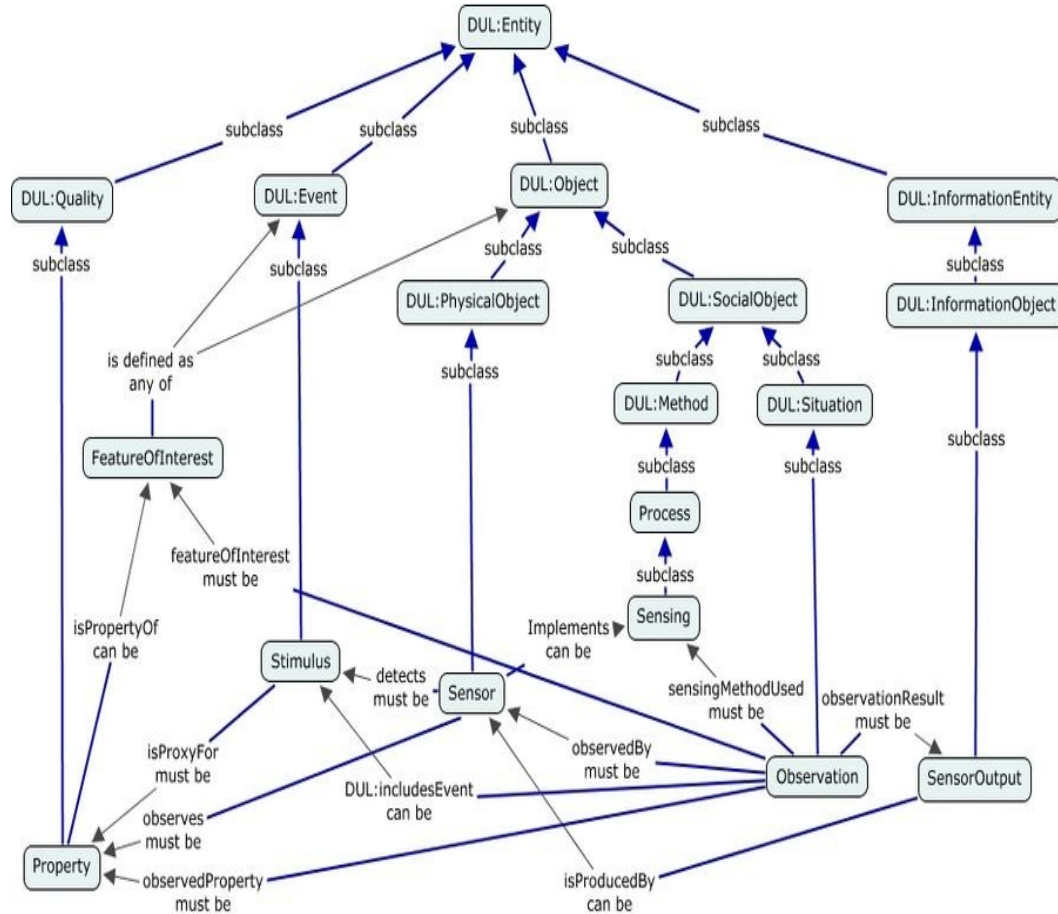
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Two ODP Examples



Why ODPs?

Tradeoff Issues in Ontologies

Original Issues

- 1) It is difficult to understand and get an overview of large ontologies or
 - 2) Foresee the effects of changes or extensions to them, or
 - 3) In engineering the full team will completely agree with all the ontological commitments that are made in such a large ontology.
-
- Interoperability problems w/o reusing any well-established practices, and
 - Difficulty aligning yourself at least partly or meaningfully to existing ontologies, create potential problems in ontology understandability

Hence trade-off between interoperability on one hand and firm (over) commitment.

ODPs Patterns are used in many areas as "templates" or abstract descriptions encoding best practices of some field.

Ontologies need to reflect reality in data which often contains common patterns, but are hard to find.

Thus grand, pre-developed “top-level” ontologies may not quite fit actual data.

Solution Approach

“For solving semantic problems, it may be more productive to **agree on minimal requirements imposed on .. Notion(s)** Werner Kuhn (*Semantic Engineering*, 2009)

Use small, well engineered, coherent, minimally constrained schemas as modular starter set ontologies with:

- explicit documentation of design rationales & best reengineering practices for reuse.
- ontology engineer needs to be aware of the consequences of reusing such components and how to make correct connections between the components being integrated.

Thus they represent a step towards more structured metadata⁴ but avoid getting lost in LARGE ontologies.

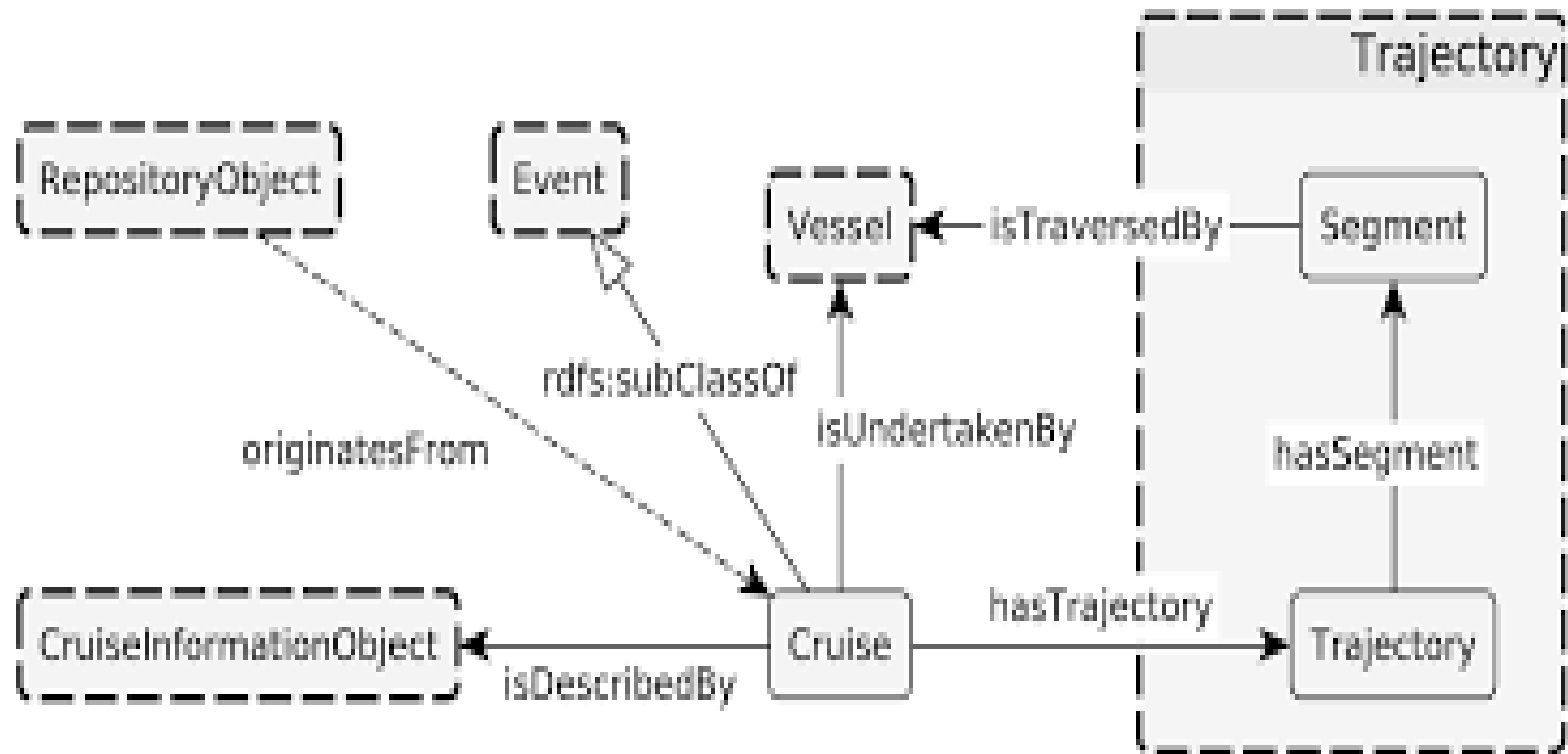
ODP Modular Operations

Gangemi and Presutti (2009)

Five types of operations that could be performed on ODPs when reusing them;

- 1) *Import*, usually making use of the owl:import functionality
- 2) *Specialization*, conceptually or after import - specialization can be done by creating sub-classes and sub-properties of the ODP classes and properties, and specialising its additional axioms using the new classes and properties.
- 3) *Generalization*, less common generalizing a set of classes and properties to be reusable also in other contexts.
- 4) *Composition*, one single ODP is rarely enough to solve all the requirements of your intended ontology, and since ODPs focus on small pieces of the overall solution, you will inevitably have to compose, i.e., combine, several ODPs or ODP specialisations in order to solve the overall problem
- 5) *Expansion*, of course you may need some new concepts

Use of Trajectory Pattern in GeoLink Project



Some Sources

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