

A Roadmap towards an Ontology Commons Ecosystem for Ontology-based Data Documentation

Nadja Adamovic, Ernst Dieter Janotka, Hedi Karray, Arkopaul Sarkar, Dimitris Kiritsis, Gerhard Goldbeck, Michela Magas, John Breslin, Lan Yang, Anna Fensel, Umutcan Simsek, Silvana Muscella, Cristina Mancarella, Florina Piroi, Emanuele Ghedini

TU Wien, École nationale d'Ingénieurs de Tarbes, Universitetet i Oslo, Goldbeck Consulting, Industry Commons Foundation, NUI Galway, University of Innsbruck, Trust-IT srl, Università di Bologna

Motivation

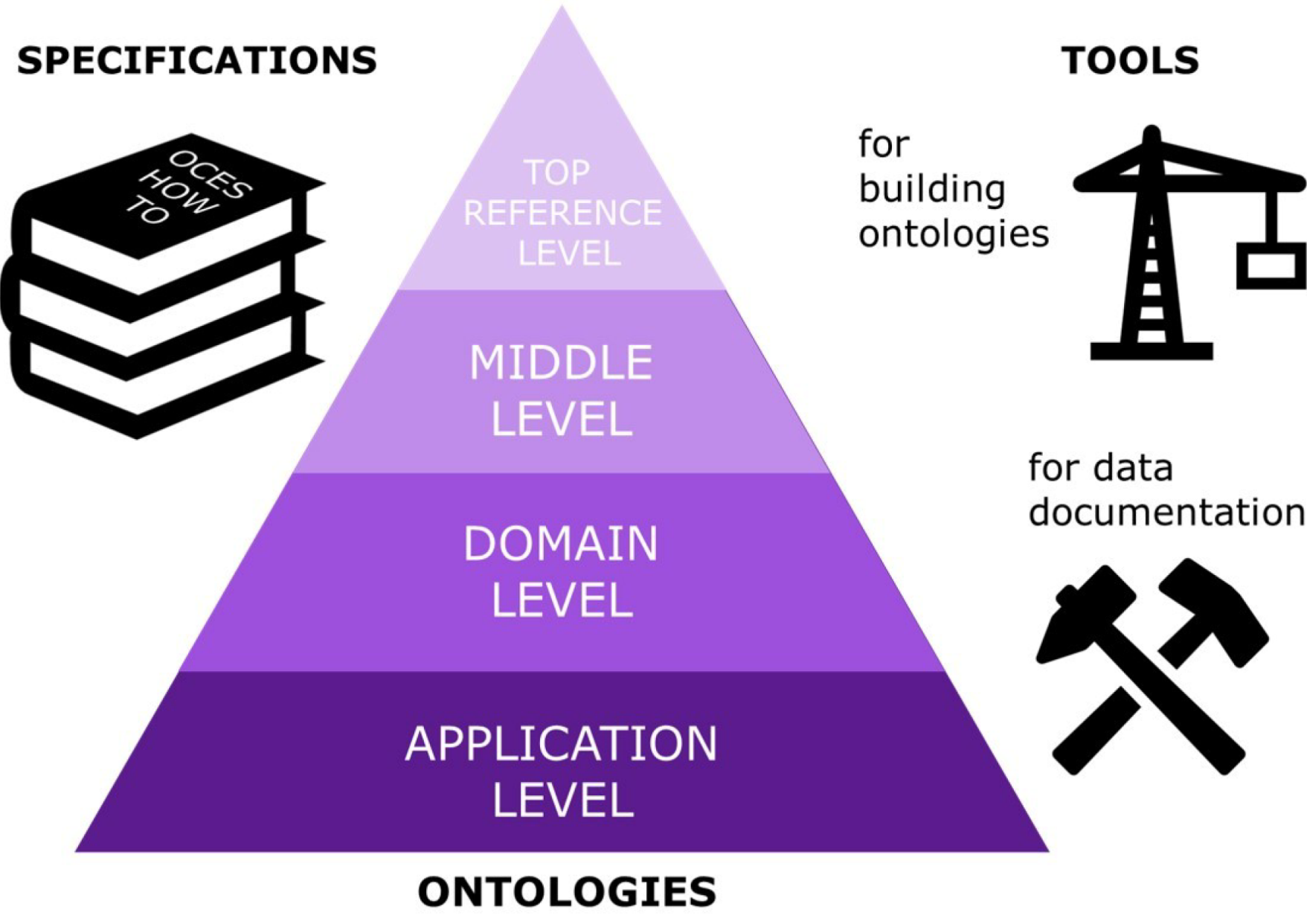
Data sharing within and across domains can offer enormous opportunities for innovation and for overcoming various bottlenecks in industry. It can help organisations to achieve the general objectives of both green and digital transition, but also more specifically, to improve resilience and bring safe and sustainable materials and products to market more quickly. However, capitalising on the unprecedented opportunities for innovation based on sharing of common assets requires a structured, systemic approach. Rather than assuming ad-hoc discovery based on a “data-soup”, an Industry Commons ecosystem based on horizontal enablers is needed. This includes an ontology-driven approach which can harmonise data documentation, support data sharing across application domains, and has the potential to stimulate and support sustainable cross-domain industrial innovation.

Needs of OCES

The development, implementation and widespread uptake of an Ontology Commons EcoSystem (OCES) is an important pillar of the Industry Commons ecosystem. In particular, high-level needs for OCES include the following:

- Effective and meaningful **data documentation to enable the harvesting** of data resources that are generated by European industry and that are currently not fully exploited.
- Covering the **gap between human and digital tools** (Industry 5.0): The need for expressing human knowledge through a widely applicable and general methodology that is both human understandable and at the same time easily processable by digital devices.
- The need to **provide machines with existing knowledge** and thus enable the exploitation of the computational power of modern HPC facilities and software.
- **Knowledge-based reasoning** as opposed to generic AI processing by formalising the knowledge already available from existing scientific disciplines and to provide knowledge structures that can be used as reference points for the analysis and interpretation of machine data and deep learning AI findings.

Ontology Commons Ecosystem Overview

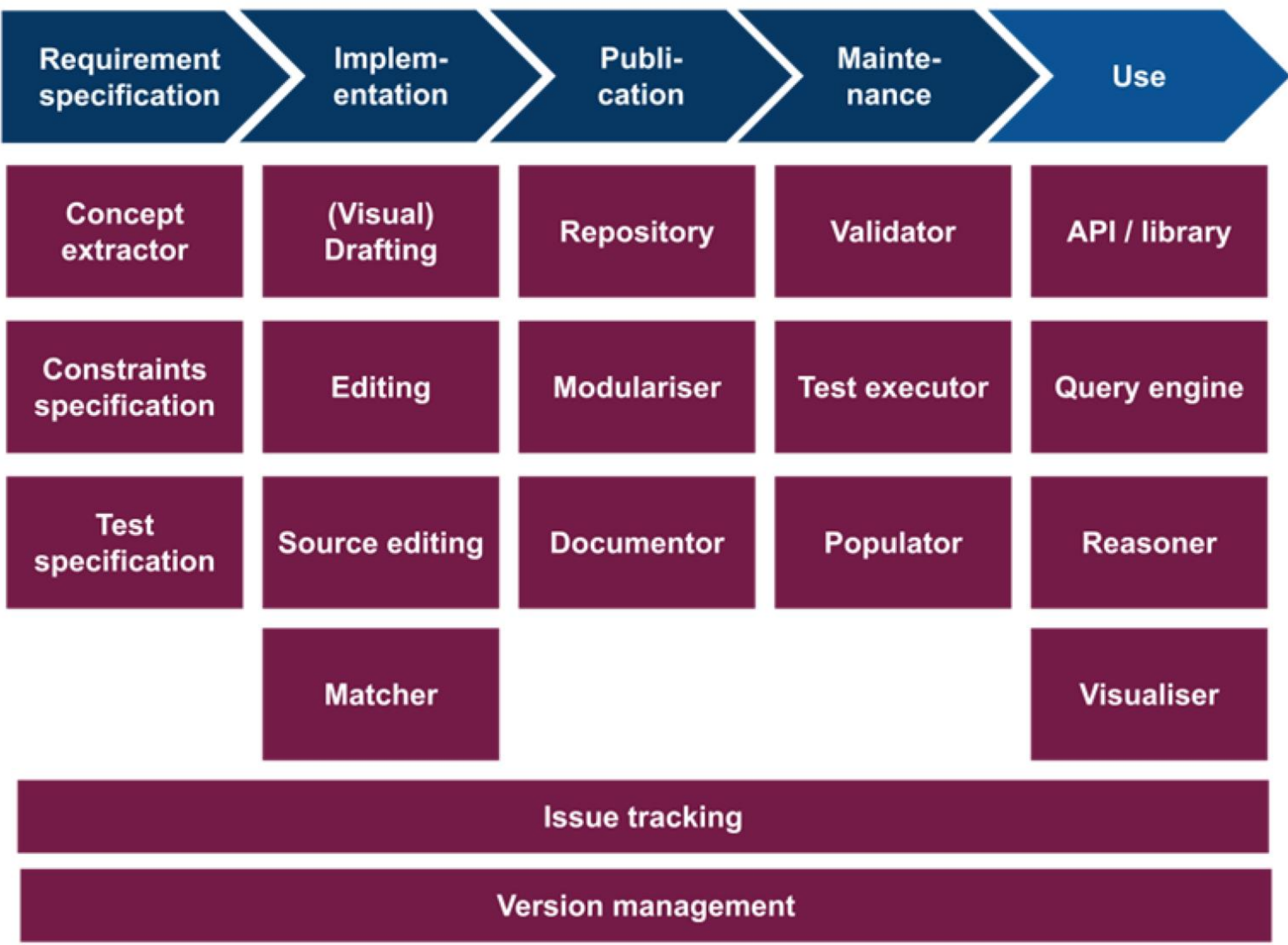


Contributions

OntoCommons Roadmap considers Needs, State of the Art, Gaps, Definition of Success and Recommended Actions for a number of topics contributing to an Ontology Commons Ecosystem for ontology-based data documentation grouped into:

1. **Ontology Foundations**
Top Reference, Middle, Domain and Application Levels
2. **Integrated Development Environment**
(Tools) and Infrastructures
3. **Industrial Impact**
including marketplaces, standardisation, education and human resources

OCES Components



Read the OntoCommons Roadmap here: <https://zenodo.org/records/7544509>

OntoCommons - Ontology-driven data documentation for Industry Commons, has received funding from the European Union's Horizon 2020 research and innovation programme under Grant Agreement no. 958371

