

# Ontology-driven semantic interoperability in practice

F. L. Bleken<sup>1</sup>, S. Gouttebroze<sup>1</sup>, T. F. Hagelien<sup>2</sup>, and J. Friis<sup>3</sup>

<sup>1</sup> SINTEF Industry, Forskningsveien 1, 0373 Oslo, Norway

<sup>2</sup> SINTEF Ocean, Brattørkaia 17 C, 7010 Trondheim, Norway

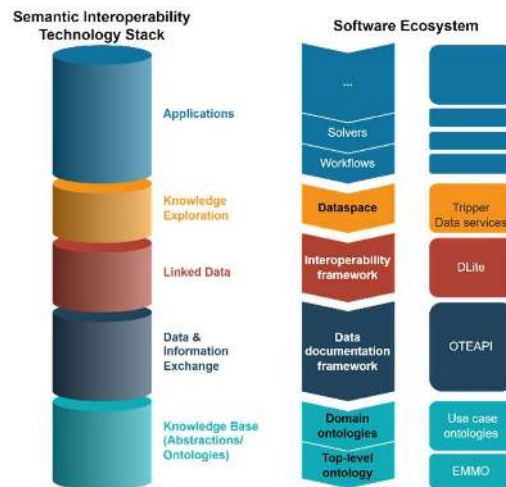
<sup>3</sup> SINTEF Industry, Høgskoleringen 5, 7034 Trondheim, Norway

Francesca.l.bleken@sintef.no

**Key Words:** *Interoperability, Data documentation, FAIR*

## Abstract

Humans can communicate intelligently, conveying a meaning that is understood by the receiver, due to a whole range of prerequisites such as a common language, mouths, ears, connections to the brain and an underlying understanding of the context. To enable machines to communicate with meaning, we propose a set of tools and a framework, featuring the innovative OTEAPI pipelines, designed to enable FAIR [1] data exchange. The ontological framework focuses on unambiguous documentation of scientific data, ensuring seamless communication between machines with meaningful context DLite [2] is the interoperability framework that provides the methodology for working with scientific data in a data-centric manner. The data documentation in done with the means of data models (entities) based on the Data model ontology [3] and mapping to ontological concepts. The access and parsing of the data sources are documented through OTEAPI [4] which, with, with the use of configurations and pipelines, streamlines the process of retrieving and reusing data.



OTEAPI Pipelines enhance the data documentation process by integrating the principles of Data Cataloguing, Metadata Extraction, and Ontological Mappings, allowing for the construction of customized data flows facilitated by the semantic interoperability framework (DLite). The data consumer at the receiving end can specify the required data and its desired representation, significantly simplifying the process of ingesting data from various sources.

The ontologies and knowledge base, including ontological mappings are stored in a triple store. Tripper [5] is a simple interface that can connect to different triple stores and contains a functionality for mapping ontological concepts and data (via data models).

## References

- [1] <https://www.go-fair.org/fair-principles>
- [2] <https://sintef.github.io/dlite>
- [3] <https://github.com/emmo-repo/datamodel>
- [4] <https://emmc-asbl.github.io/oteapi-core>
- [5] <https://emmc-asbl.github.io/tripper>

Francesca L. Bleken is a research scientist at SINTEF, Norway. She has a background in both experimental and computational chemistry, mostly in the field of (heterogenous) catalysis and has a Ph.D. in Physical Chemistry. Her interest in the field of making data interoperable is mainly from the data scientist's perspective. She has a coordinating role in the SINTEF team developing the presented stack of tools. This team consists of a mix of chemists, physicists, engineers, and software developers aiming at creating a robust and usable framework for interoperability.