

A technology stack for semantic interoperability

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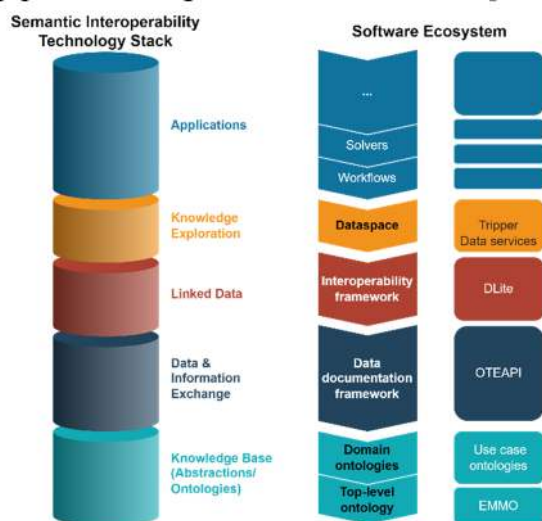
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Abstract

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 is done with the means of data models (entities) described by the Data model ontology [3]. These data models are made fully semantic by mapping their properties to ontological concepts. The access and parsing of data sources as well as serialisation and deposit to data consumers are documented through OTEAPI [4] which, 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 customised data flows, facilitated by the underlying 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 also 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>