

# Metadata4Ing: An ontology for describing the generation and provenance of research data within a scientific activity

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Knowledge graphs basing on ontologies enables us to describe and connect research data, software, methods, actors and instruments in a machine readable and actionable manner. Ontologies function in this context as a formalized language that unify a semantic description of research results, their content and their provenance.

Metadata4Ing (m4i) (<https://w3id.org/nfdi4ing/metadata4ing/>), developed within NFDI4Ing, is a mid-level ontology that provides a framework for the semantic description of research data, with a particular focus on engineering and neighbouring disciplines. It offers terms and properties for the description of scientific workflows and research results. It considers, for example, the object of investigation, sample and data manipulation procedures, a summary of the data files, and personal and institutional roles of participants in data-driven research processes. The terms of Metadata4Ing are available on the terminology service of NFDI4Ing (<https://terminology.nfdi4ing.de/ts4ing/ontologies/m4i>) and on Linked Open Vocabularies (<https://lov.linkeddata.es/dataset/lov/vocabs/m4i>).

Metadata4Ing builds on existing ontologies like the Basic Formal Ontology (BFO), the PROV Ontology and the Data Catalogue Vocabulary (DCAT) and is extendable to the requirements of specific fields by deriving subclasses with specific properties. A subontology for high performance computing (HPC) workflows is currently in development.

The description of engineering processes can benefit greatly from the joint usage of m4i together with the existing and planned databases and knowledge graphs for models, algorithms and software developed within MaRDI. This talk will present the basic concepts and data model of m4i, its connection points to MaRDI and the prospective usage of m4i to describe HPC processes and results.

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**Sitzung Einordnung:** Invited Talks

**Track Klassifizierung:** Main Track: Track 1