# KG and Ontology Construction

##### Session 1.4 (SEMANTiCS)

#### Time: Wednesday, September 18, 2024 - 10:40 to 12:00

#### Chair: Milan Dojchinovski

## **Talks**

### From UML to OWL: Enterprise Architect as an Ontology Editor

We introduce a new approach, where existing data models are automatically transformed into ontologies. We build on existing SPARQL-based approaches that transform UML models (in XML or via an ODBC connection) to the Meta Information Model (MIM) standard. Subsequently, MIM can be transformed into OWL+SHACL. Existing approaches require that the source UML model is specifically annotated for use with the MIM standard, but data architects in companies often do not want to add such annotations. We therefore also automate the addition of MIM annotations. This results in a completely automated pipeline from UML tools like Enterprise Architect to an OWL+SHACL model.

We believe that the best tool for modeling OWL+SHACL is sometimes a widely adopted UML tool. This is specifically the case when there is a lack of experience with semantic modeling. We think that our approach will be used in a growing number of commercial project, and will allow linked data projects to be more successful.

| Wouter BeekTriply | Linda van den Brink | Elena Slavco |
| --- | --- | --- |

### Managing mapping complexity with Mapping Workbench [SP]

Mapping complex XML data to RDF is a significant challenge for organizations seeking to ensure data interoperability and construct accurate knowledge graphs. This complexity often leads to errors, inefficiencies, and increased costs. Mapping Workbench (MWB) addresses these issues by providing a collaborative platform that simplifies the entire mapping process through a test-driven methodology and user-friendly interface. MWB has already proven its value by successfully mapping Public Procurement Data of the European Union, demonstrating its ability to handle large-scale, complex data transformations efficiently. By enabling seamless collaboration between domain experts and Semantic Engineers, MWB ensures high-quality, validated mappings that accelerate project timelines and reduce overall costs.

| Eugeniu CostetchiMeaningfy |
| --- |

### Leveraging Knowledge Graphs and Machine Learning for Automated CO2 Footprint Calculation of Buildings

The building design, construction, and operation sectors face sustainability challenges due to a fragmented manual processes, lack of integrated, automated solutions. There is a need for: 1) a scalable solution that complies with the Environmental, Social, and Governance (ESG) factors to identify material risks and growth opportunities 2) a comprehensive solution that can effectively extract the semantic information from both structured and unstructured data and further integrate this knowledge across various data silos for downstream applications. However, this presents some challenges including but not limited to, ambiguous and interconnected domain concepts, necessity for domain- and customer-specific business knowledge, large volumes of (un)structured data, etc.. Our cloud-based semantic data modeling approach ai:cm can effectively address these challenges using advanced information retrieval techniques and semantic data modeling. The semantic aspect of our solution ai:cm offers reusability and interoperability of existing data models, like Industry Foundation Class (IFC), extensibility for new data inputs and requirements, validation and execution of business rules using SHACL shapes, and UI generation for ad-hoc updates.

| Lokesh Sharma | Martin Voigt |
| --- | --- |

### 

### Ontology based Event Knowledge Graph enrichment using case based reasoning

We proposed the XPEventCore ontology to represent 5W1H characteristics of events by integrating multiple event ontologies (SEM and FARO) and introduced new object properties for representing Cause and Method to answer “Why” and “How” questions. We adopted this XPEventCore ontology for a specific use case (the MR4AP Wikipedia dataset), and populated our EKG. Furthermore, we adapted EvCBR, a case-based reasoning approach, to enrich this EKG.

| Rajesh Piryani | Nathalie Aussenac-Gilles | Nathalie Hernandez |
| --- | --- | --- |
| Cédric Lopez | Camille Pradel |  |

### 