On the use of Ontologies for GDPR compliance: the case of H2020 BPR4GDPR

The H2020 BPR4GDPR project aims at bringing about a new GDPR compliance paradigm, by providing the tools and methodologies that will facilitate the implementation of the appropriate technical and organisational measures, particularly by SMEs. In this context, it provides various types of tools, including mechanisms for the automatic verification and re-engineering of Business Processes towards becoming compliant, as well as appropriate run-time components for enforcing compliance requirements.

The ground of the BPR4GDPR solutions consists of a set of ontologies that essentially constitute a comprehensive model of the GDPR basic concept and requirements. The most important ontological models are the following:

- **Information Model Ontology**: It incorporates all fundamental concepts, including personal data types, purposes, operations, roles, organisations, machines, context, etc.; Figure 1 depicts a high-level diagram of classes, whereas Figure 2 illustrates an example personal data graph, highlighting the hierarchical properties.

- **Policy Model Ontology**: It provides the appropriate ontological structures for the specification of policies, in terms of access and usage control rules that associate actors, data, operations, purposes, pre-/post-actions and contextual parameters into permissions, prohibitions and obligations. Figure 3 presents the diagram of classes.

- **Workflow Model Ontology**: Also referred to as the 'Compliance Metamodel', it constitutes a process modelling approach that enables the incorporation of security and privacy constraints into the process models. Further, it allows for comprehensively capturing all underlying concepts, such as actors, data assets and flows. Figure 4 illustrates the high-level diagram of classes.
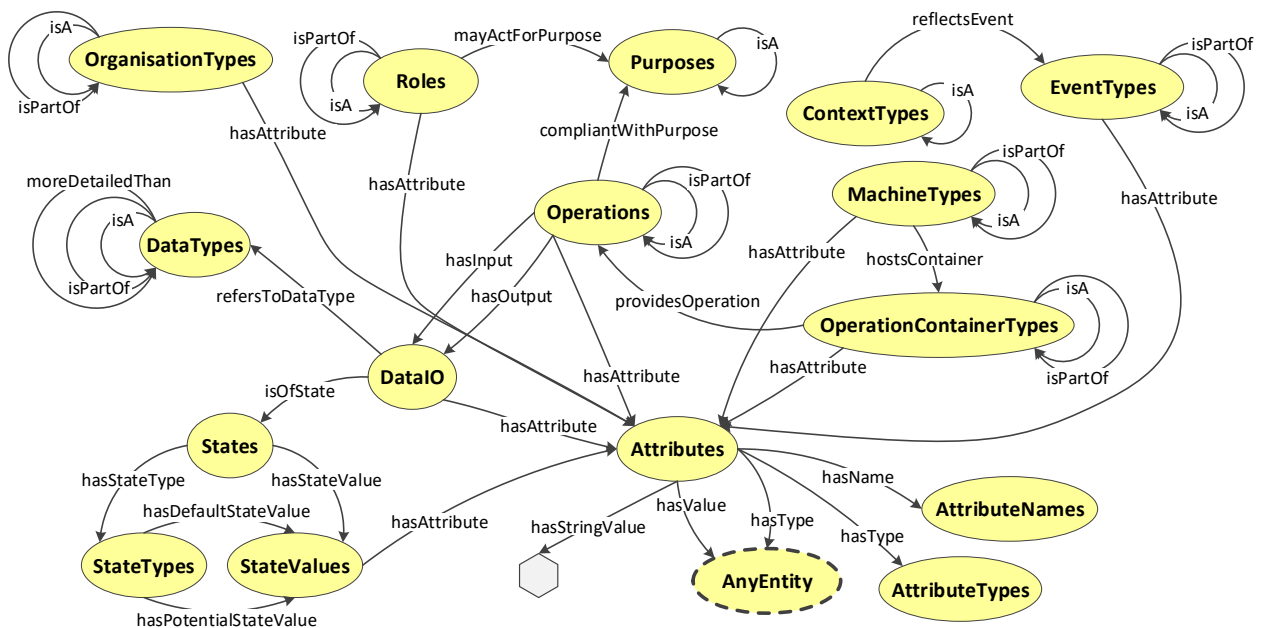

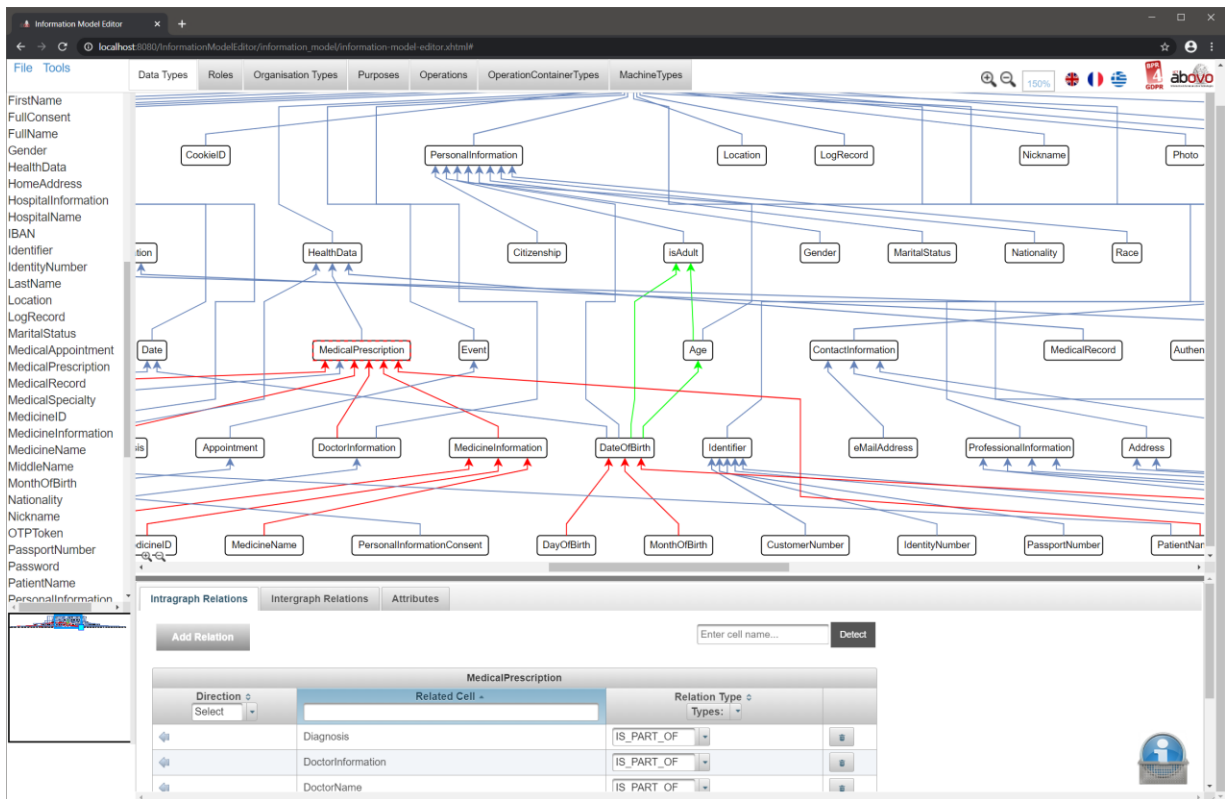*Figure 1: Information Model Ontology structure*
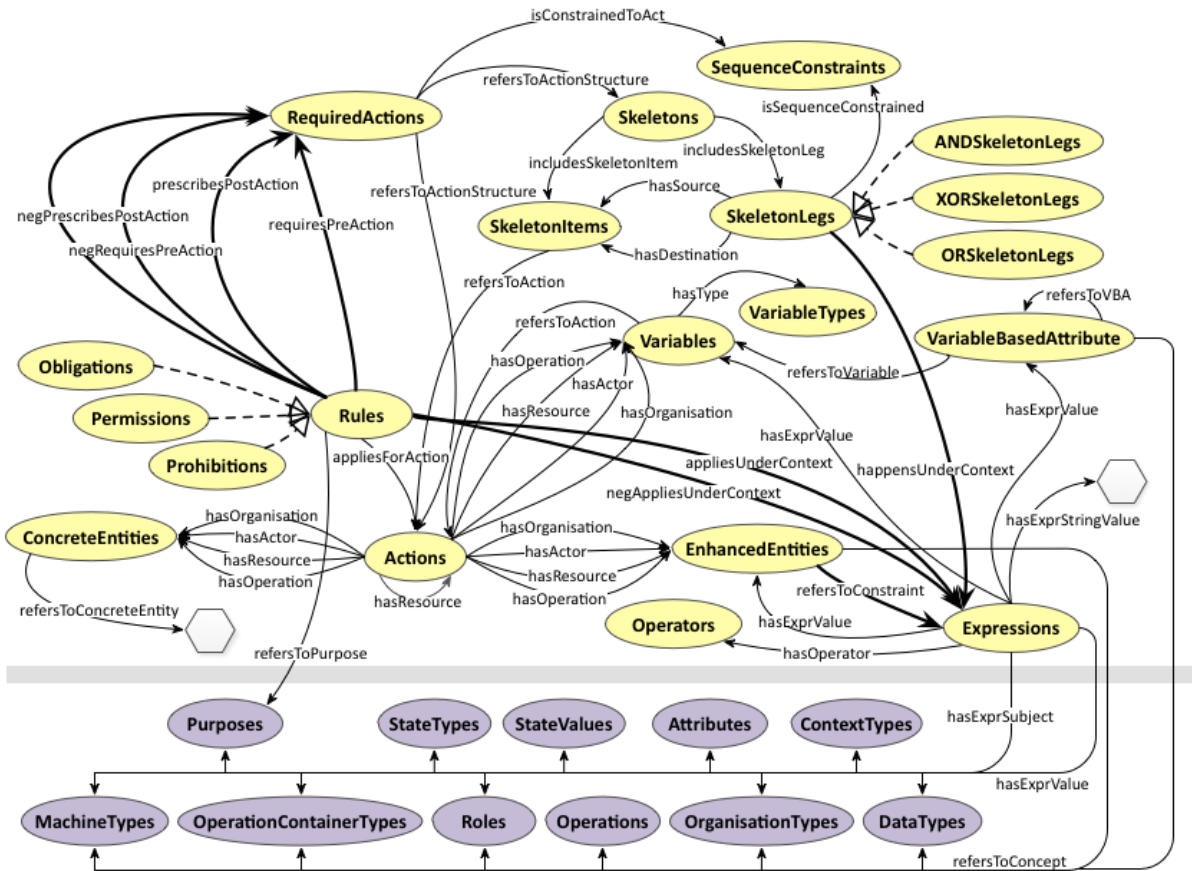
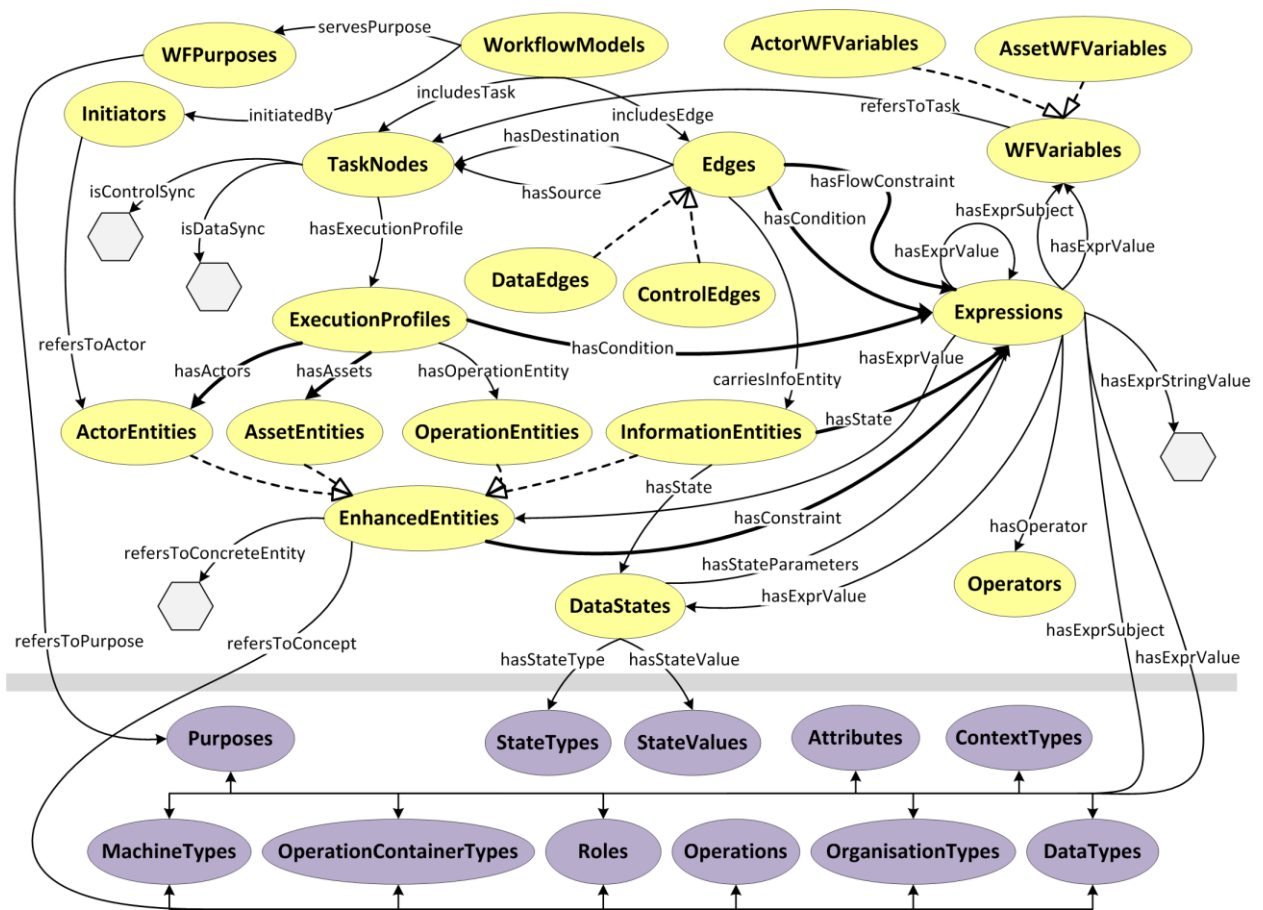Figure 2: Example personal data graph

Figure 3: Policy Model Ontology structure

Figure 4: Workflow Model Ontology structure