Subject: railML ontology for automated certification
Posted by Larissa Zhuchyi on Tue, 04 Apr 2023 11:15:58 GMT
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Dear all

As there had already been announced, railML 2 ontology development is in the progress [1]. This forum post is to ask for the community ideas on the translation of railML 2.5 XSD into ontology, namely how close should railML 2 ontology and railML 2 XSD be:

1. Should railML 2 ontology (railway domain) include only railway-related concepts or also classes based on highly abstract complex types like tElementWithIDAndName?

2. Should railML 2 ontology include classes based on XSD container elements? Consider an example of balises. Shall ontology include only classes "Balise" and "BaliseGroup" or "Balises" as well?

Please note that ontology working group participants agreed that railML ontology should be developed OWL (vocabulary) and SHACL (constraints).

The explanation for question 1. One of the good practices of ontology development is to separate concepts in modules related to topics. Because of that there are for example "Basic Formal Ontology" with high-level concepts and domain ontologies that reuse it.
Complex types of infrastructureTypes.xsd refer to ones like tElementWithIDAndName in genericRailML.xsd which are highly abstract. Currently, draft vocabulary and constraints of the railML 2 ontology include only railway-related concepts like switches, tracks etc. and it is uncertain whether ontology should also include classes based on complex types like tElementWithIDAndName. For now, it is suggested to try to get by with railway domain classes only and if they are not enough for some applications then extend ontology.

The explanation for question 2. My rough analysis of the "XML2OWL" literature shows that there are two approaches for translation: mint URI for elements that miss them [2] or omit elements that do not have a lot of semantics in them [3]. In that, it might be reasonable to mint URI only for containers that include something like sequences in them and omit the rest while translating railML XSD into OWL and SHACL. This omitting can also help to manage a big number of triples describing railway infrastructure.

This forum post is based on a discussion of the ontology working group which is open to join for every railML member.

References
[1] https://www.railml.org/en/public-relations/news/reader/railml-ontology-subgroup-started.html
[2] Lange, Christoph. "Ontologies and languages for representing mathematical knowledge on the semantic web." Semantic Web 4.2 (2013): 119-158.
[3] https://www.xml.com/pub/a/2004/09/01/tr.html