

Formal Foundations for RDF Evolution and Repair

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Abstract: There are ongoing efforts to provide declarative formalisms of integrity constraints over RDF data. In this context, addressing the evolution of RDF knowledge bases while respecting associated constraints is a challenging issue, yet to receive a full formal treatment. This problem has become more important with the emergence of Linked Open Data, which is based on RDF. Linked Open Data is becoming a key enabler as it is rapidly being taken up by governments and organizations to make their information available and usable, and is the basis of significant economic activity around an emerging "data economy".

In this talk we describe a theoretical framework for dealing with both schema and data change requests, based on the notion a rational change operator as one that satisfies the belief revision principles of Success, Validity and Minimal Change. The semantics of such an operator is subject to customization, by tuning the properties that a rational change should adhere to. We prove some interesting theoretical results, as well as algorithmic solutions. We then show how the problem of ontology repair can be addressed with similar techniques. And we conclude with a discussion of challenges that need to be addressed to further advance the state of the art.

Keywords. RDF knowledge evolution, integrity constraint, Linked Open Data, data economy, schema and data change, belief revision, ontology repair.

Key Terms. LinkedData, KnowledgeEvolution, KnowledgeRepresentation, KnowledgeManagementProcess.