Property Graphs to Virtual RDF with Schema Reflection

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Property graphs (PGs) and RDF graphs are widely used to store and query connected data, while RDF remains the basis for publishing and linking data on the Web. Existing PG-to-RDF approaches either apply fixed direct mappings or provide custom mapping languages [3, 1] that lack *schema reflection* [2], i.e., the ability to use labels and property keys as rule variables. Without it, a mapping needs a separate rule for every label and every property key of the PG, or must retrieve them through source queries outside the mapping language. Moreover, all existing implementations of such languages only materialize the RDF graph. We introduce *pg-trgds*, a PG-to-RDF mapping language with a formal semantics that is schema-reflective: its rules use property graph conjunctive queries (PGCQs) whose variables range over labels and property keys, so a single rule can cover all labels and keys of a PG. We present a SPARQL-to-GQL rewriting algorithm for virtual query answering over the source PG and prove its correctness under set semantics. A prototype evaluation shows consistently better performance than the evaluated custom PG-to-RDF implementations for materialization, low rewriting overhead, and practical end-to-end virtual query answering with respect to Ontop over a relational (SQL) representation of the PG.

References

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