

# Querying Temporal Databases via OWL 2 QL

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## Abstract

SQL:2011, the most recently adopted version of the SQL query language, has unprecedentedly standardized the representation of temporal data in relational databases. Following the successful paradigm of ontology-based data access, we develop a practical approach to querying the SQL:2011-based temporal data model via the semantic layer of OWL 2 QL. The interval-based temporal query language (TQL), which we propose for this task, is based on naturally characterizable combinations of temporal logic with conjunctive queries. As the central contribution, we present rules for sound and complete rewriting of TQL queries into two-sorted first-order logic, and consequently, into corresponding SQL queries, which can be evaluated in any existing relational database management system compliant with the SQL:2011 temporal data model. Importantly, the proposed rewriting is based on the direct reuse of the standard rewriting techniques for conjunctive queries under OWL 2 QL. This renders our approach modular and easily implementable. As a notable corollary, we show that the data complexity of TQL query answering remains in AC0, i.e., as in the usual, non-temporal case.