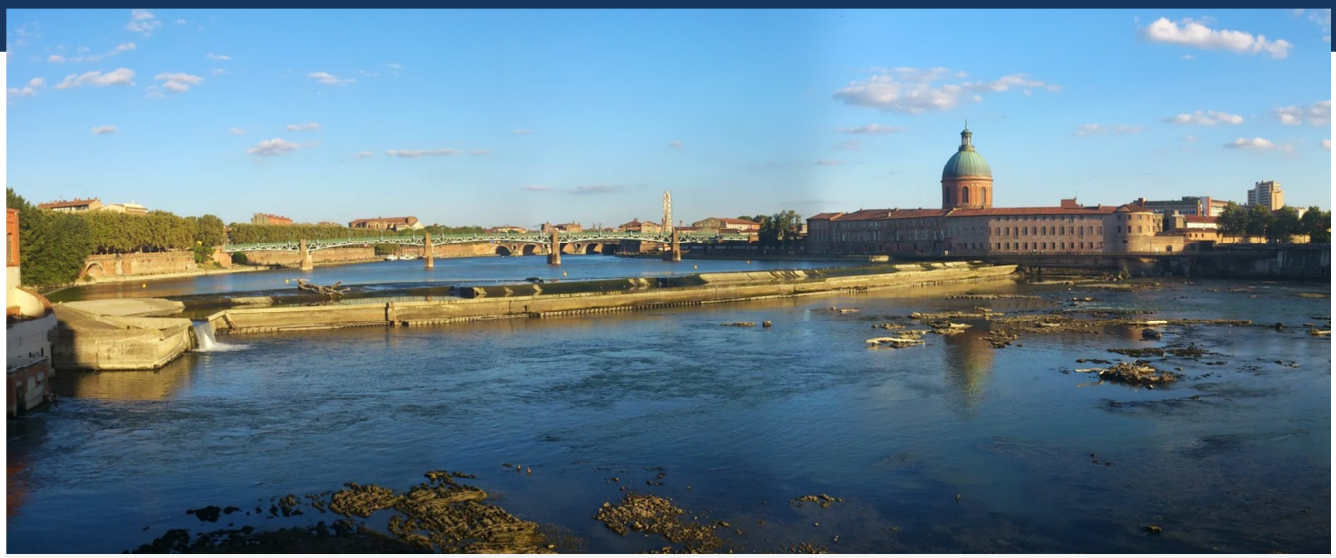

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Knowledge Bases Integration

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Content

The IBC ("Intégration de Bases de Connaissance" - Knowledge Bases Integration) project addresses the question of ontology based data integration, in the context of the MMT (Man Machine Teaming) initiative. It aims at combining data residing in different actors (aircraft, drone, sattelite, ...) during an air mission scenario and providing users with a unified view of all available data, in a communication constrained environment.

One of the main classic challenges in such context is semantic interoperability. Interestingly, this issue is mentioned as a key application of ontologies since its early descriptions. Thus, we propose an integration-based solution grounded on an ontology-based peer-to-peer mediation architecture, in which each actor hosts: (1) a global ontology of air missions, giving a formal explicit specification of the shared knowledge between actors during missions through a set of concepts, roles and rules ; (2) mappings, describing the content of distant actors data sources expressed using concepts from the ontology, and designed according to the well-known Local-As-View approach ; (3) a fact base, containing data essentially acquired during missions ; and (4) a query evaluation algorithm based on the ontology, thus able to obtain extra relevant answers through ontological inference.

We present the ontological query evaluation process according to the design choices we made. First we discuss about the ontology itself and the way we distribute knowledge into an OWL ontology on one hand and a set of existential rules on the other hand. Then we argue for an ontology-mediated query answering approach based on backward chaining (as in a logic programming approach). We focus on strengths and weaknesses of such a reasoning. We describe our in progress implementation which runs inside a **JENA** distributed environment, using mainly its backward chaining rule engine, with data stored as RDF triples inside distributed **TDB** triple stores. Eventually, we show how communication risks (communication temporarily suspended, reduced amount of transferred data, ...) can be handled in this context.

Keywords : Model-based architecture design, Task scheduling, Safety analysis