Towards Cost-model-based Query Execution over Hybrid Linked Data Fragments Interfaces
Amr Azzam, Ruben Taelman, Axel Polleres

Abstract
A multitude of Linked Data Fragments (LDF) server interfaces have been proposed to expose Knowledge Graphs (KGs) on the Web. Each interface leads to different trade-offs when clients execute queries over them, such as how query execution effort is distributed between server and client. There is no single silver bullet that works best everywhere. Each of these interfaces has diverse characteristics that vary the performance based on server load, client resources, and network bandwidth. In this paper, we lay out the high-level ideas to introduce a hybrid LDF framework that can expose multiple interfaces based on a server-side cost model. In addition, we sketch a negotiation protocol through which clients can determine desirable interfaces during query planning using a client-side cost model.

Linked Data Fragments Spectrum
Linked Data Fragment Framework (LDF) Proposed to design new mixes of trade-offs.

Cost-based Hybrid Framework
- The goal of our framework is to expose different server interfaces based on a server cost-model that takes into account the server load and the query shapes. We expose a collection of interfaces per query.
- This allows clients to select a combination of interfaces based on a client cost-model that considers the client capabilities and query plans.

Implementation Plan
- The client component will be implemented using the Comunica platform.
- Comunica supports the majority of the LDF interfaces and SPARQL query operators.
- Comunica Architecture follows mediator pattern that will ease the extensibility of multiple cost models.

GetInterfaces(q, metrics, interfaces, GetValue, GetThreshold)
allowedInterfaces = []
FOREACH interface IN interfaces
validInterface = true
FOREACH metric IN metrics
increase = GetValueIncrease(metric, q, interface)
IF GetValue(metric) + increase > GetThreshold(metric)
validInterface = false
IF validInterface
allowedInterfaces.push(validInterface)
RETURN allowedInterfaces

Listing 1: Algorithm for calculating the allowed interfaces for a given query.

Figure 1: Overview of client-server communication for a cost-model-based query execution over a hybrid of Linked Data Fragments interfaces.

Contact
Amr Azzam
Vienna University of Economics and Business
Vienna, Austria
Email: azzam@wu.ac.at
Ruben Taelman
Ghent University, Ghent, Belgium
Email: ruben.taelman@ugent.be
Website: www.rubensworks.net

Reference