RESTful writable APIs for the web of Linked Data using relational storage solutions
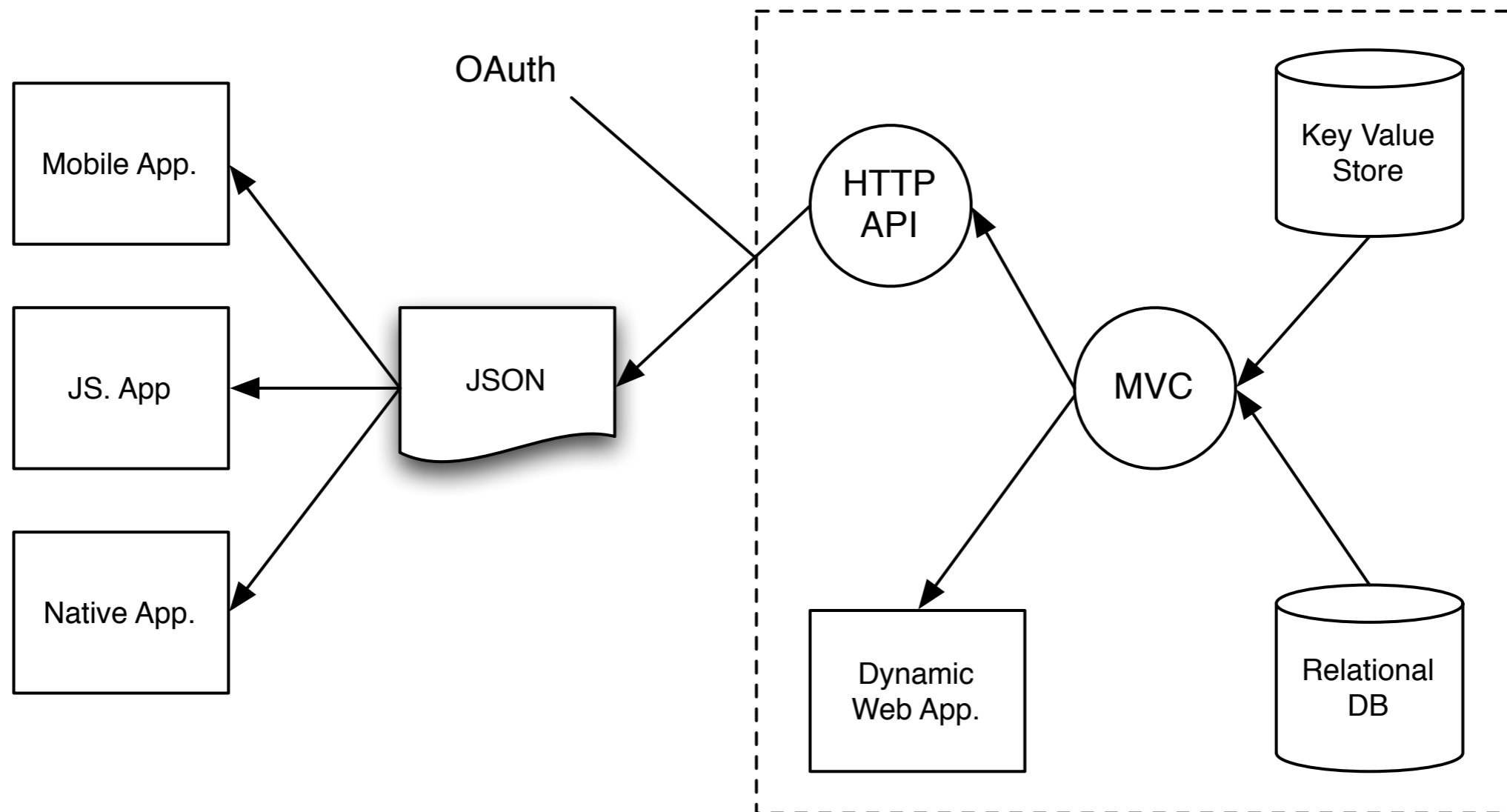
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Outline

Web APIs

Mobile App.

JS. App

Native App.

JSON

OAuth

HTTP API

MVC

Key Value Store

Dynamic Web App.
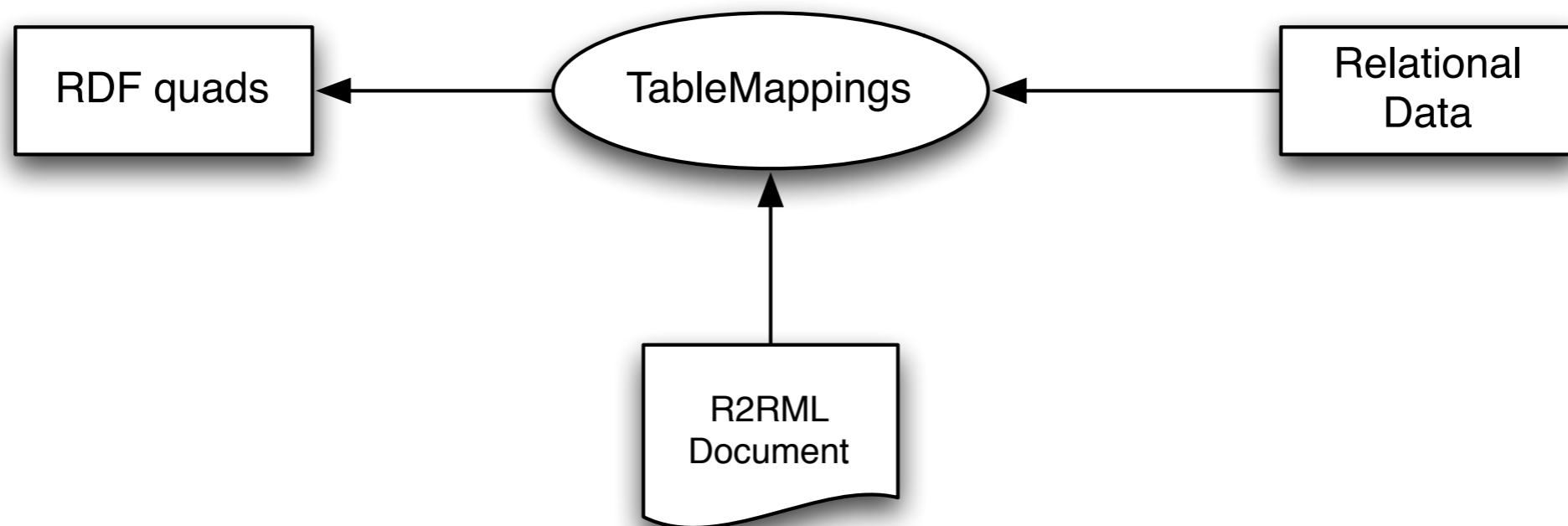
Relational DB

Linked data APIs?

- RDF data model vs JSON objects

- Object IDs vs URIs

- Properties identified by URIs vs plain strings

- URIs linking data in different services

Transition path

- Translation of SPARQL update queries into SQL queries

- RDF graphs encoded in JSON objects
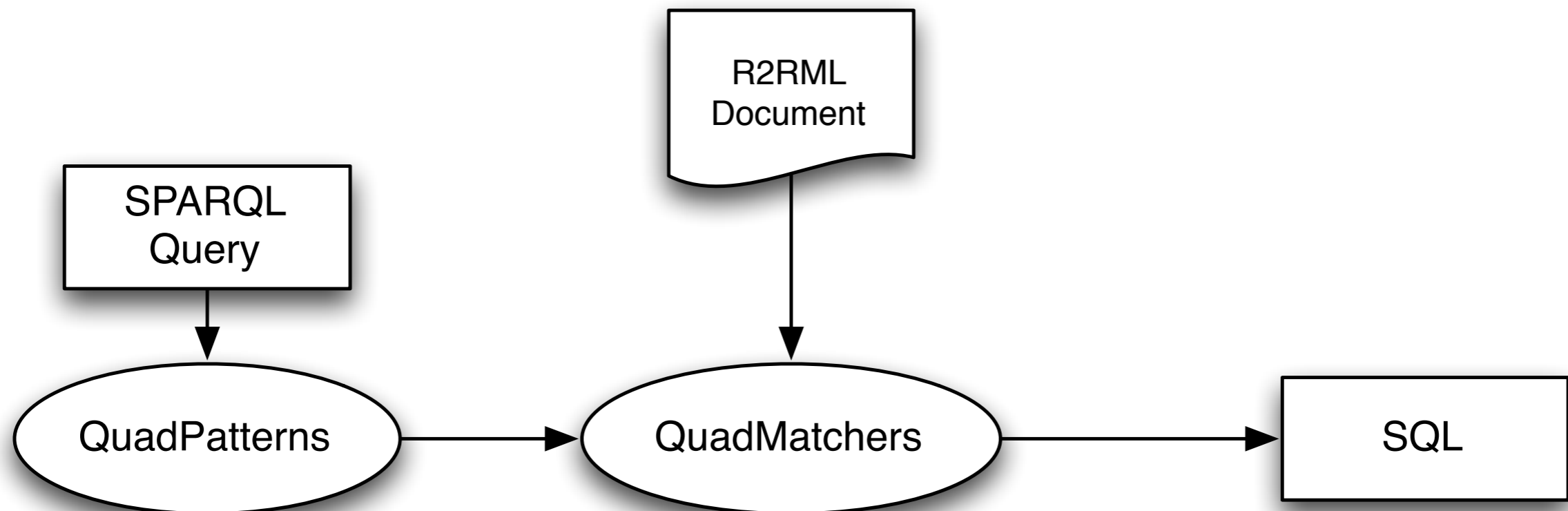
- RESTful protocol to manipulate RDF graphs

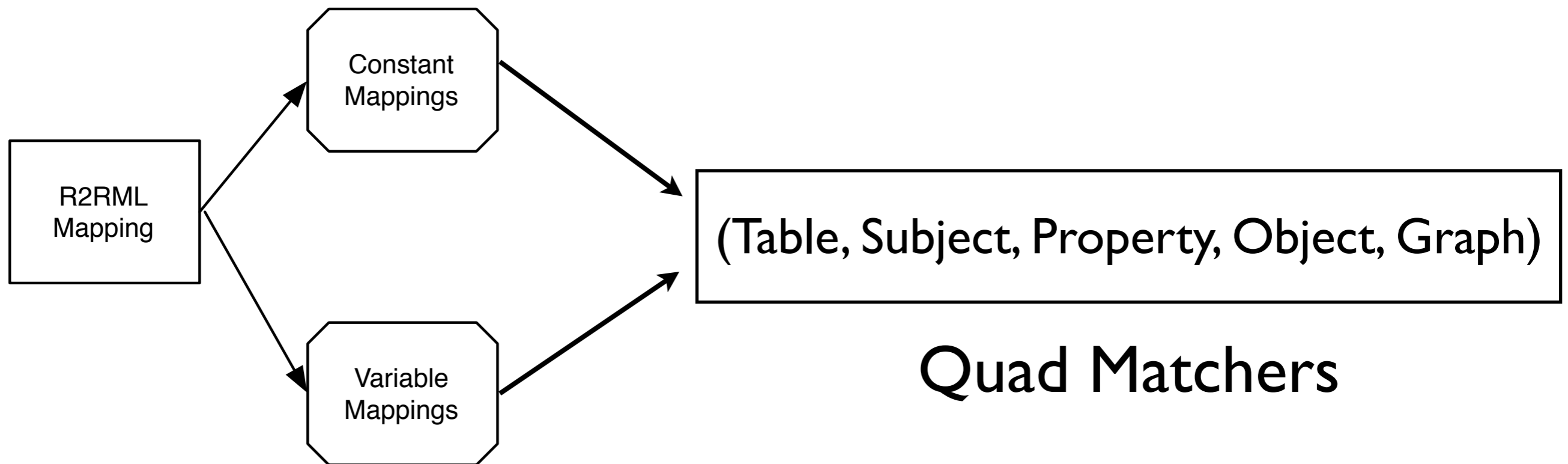# SPARQL to SQL translation

- R2RML starting point

SPARQL to SQL translation

- inverse transformation

SPARQL to SQL translation

```
         ┌──────────────┐
         │  Constant    │
         │  Mappings    │
         └──────────────┘
              ↗        ↘
┌──────────┐              ┌──────────────────────────────────────────┐
│  R2RML   │              │                                          │
│ Mapping  │              │ (Table, Subject, Property, Object, Graph) │
└──────────┘              │                                          │
              ↘        ↗  └──────────────────────────────────────────┘
         ┌──────────────┐
         │  Variable    │              Quad Matchers
         │  Mappings    │
         └──────────────┘
```

SPARQL to SQL translation
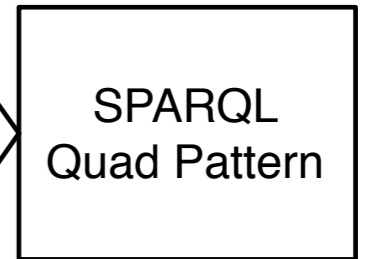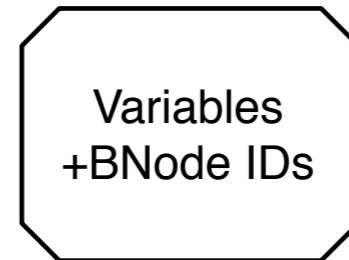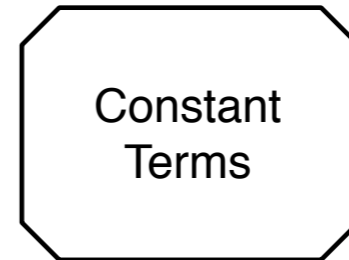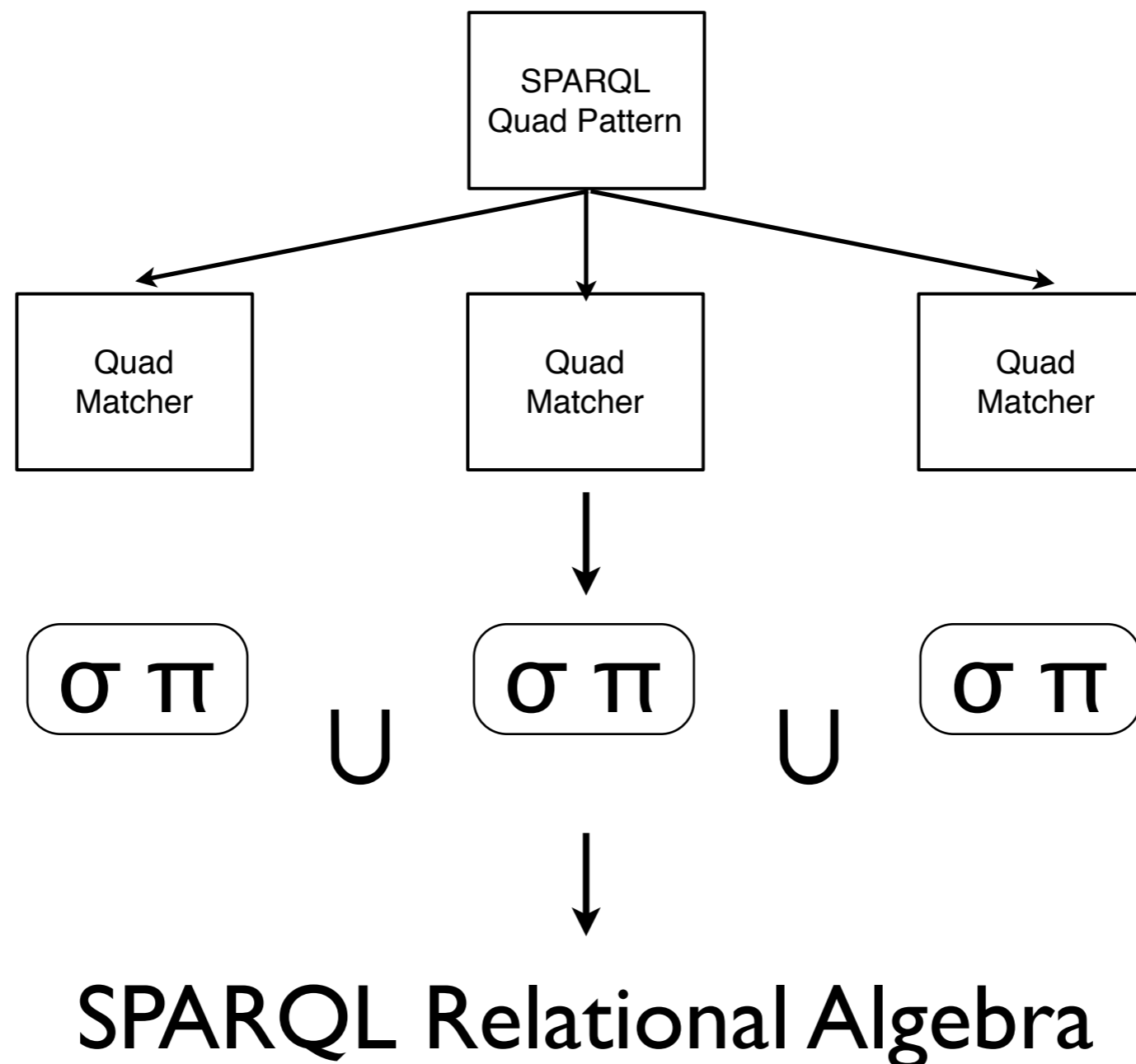
(Table, Subject, Property, Object, Graph)

Compatible?
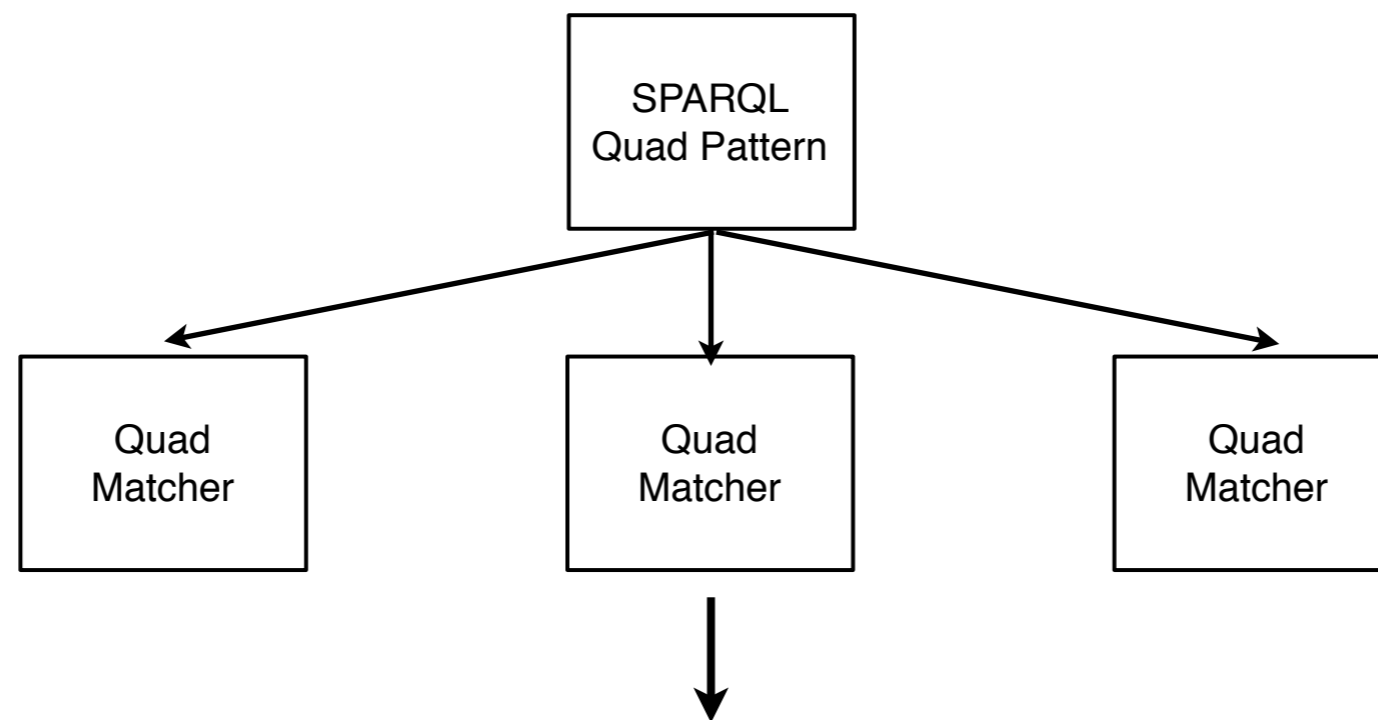
Constant Terms

Variables +BNode IDs

SPARQL Quad Pattern

SPARQL to SQL translation

SELECT

SPARQL to SQL translation

Insert

SPARQL
Quad Pattern

Quad
Matcher

Quad
Matcher

Quad
Matcher

Min. Insertion Cost metric

Insert / Update SQL DM Query

SPARQL to SQL translation

- Different compatibility functions: data types, language tags in literals

- R2RML extensions to generate IDs from URIs

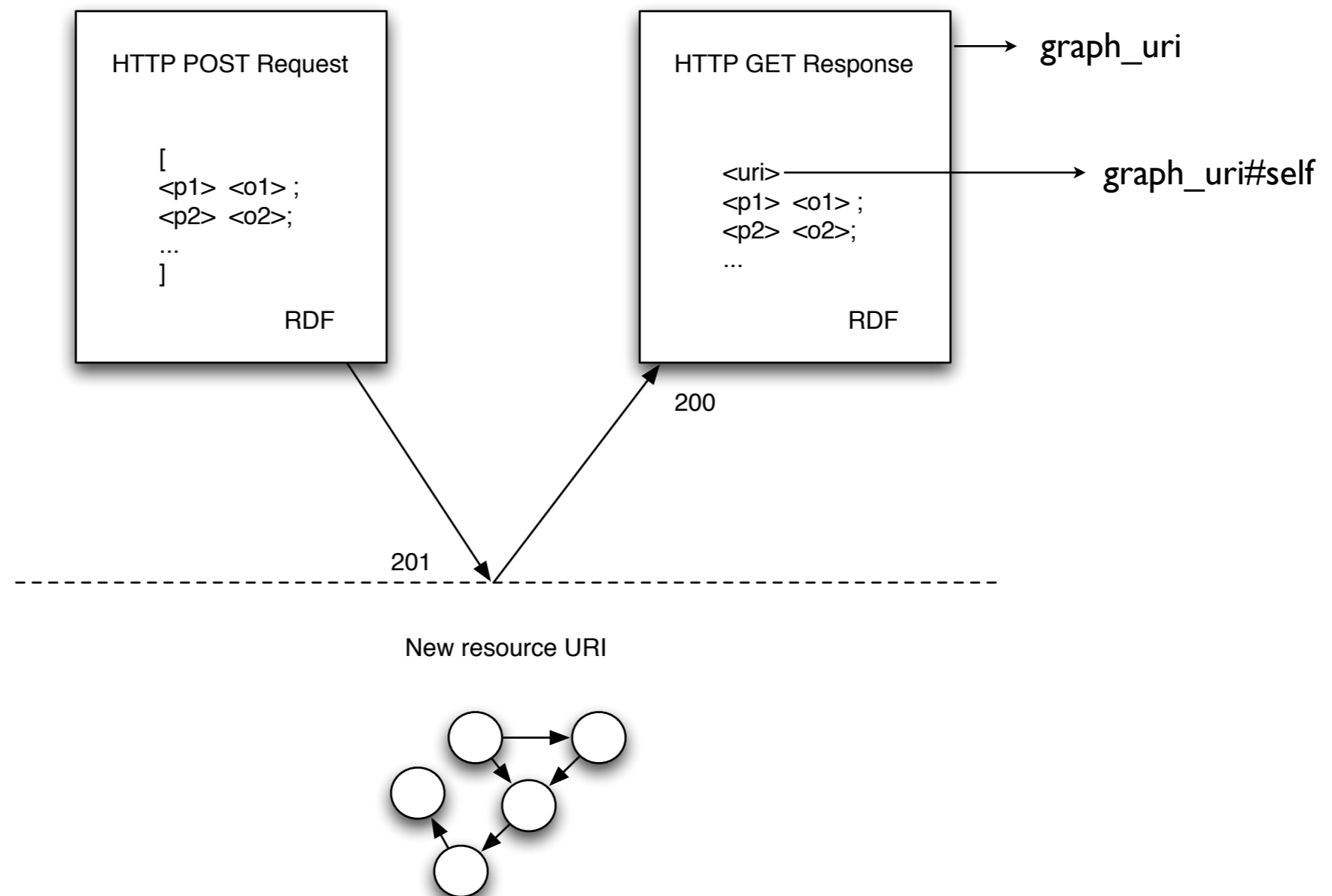- Limitations: auto increment columns and database constraints

RESTful API

- Starting point: "SPARQL 1.1 Uniform HTTP Protocol for Managing RDF graphs"

- Granularity: RDF named graph

- HTTP uniform interface semantics

RESTful API

- Declarative definition of APIs (RDFS vocabulary)

  - URI templates

  - Mapping of templates to SPARQL endpoints

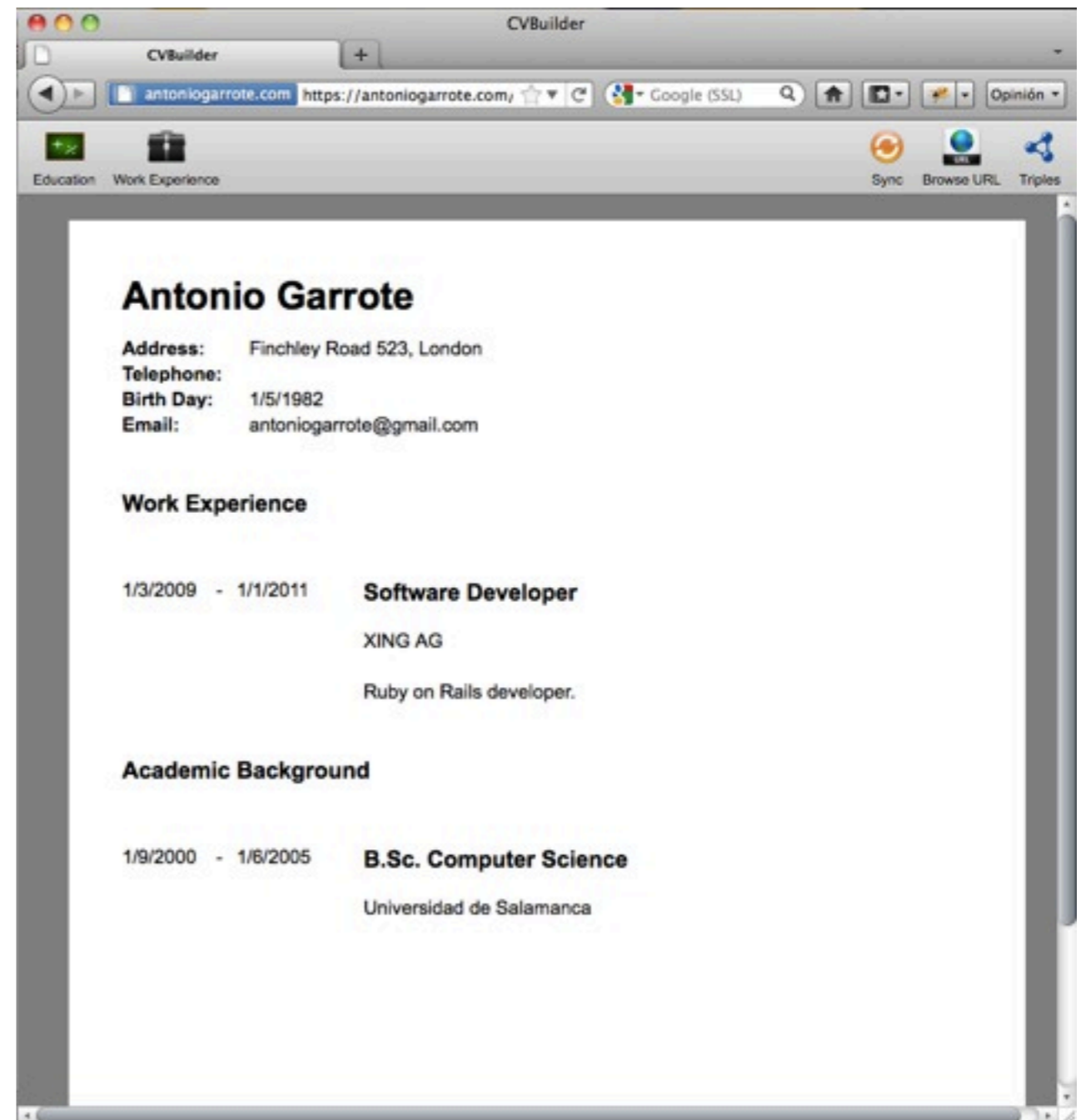# RESTful API

- Minting of resource URIs

RESTful API

- Extensions (linked-data-api):

  - JSON-LD as the primary media type

  - Method overloading

  - JSONP support

  - Format URL parameter

  - Pagination parameters

Sample Application

- Library

- Prototype

  - JavaScript client

  - RESTful API

  - FOAF+SSL auth

  - Relational backend

http://github.com/antoniogarrote/clj-r2rml

http://antoniogarrote.com/cvbuilder

Conclusions

- Linked data and sem. web technologies can help us to build better web APIs

- Huge opportunity to increase the amount of linked data available in the web

- Real benefits for end users

- Easy transition path for web developers must be provided