

KNOWDIVE



KGE - Knowledge Graph Engineering

Exploiting Knowledge Graphs

SPARQL and GraphDB

Alessio Zamboni

Contents

1 GraphDB

2 Dataset

3 SPARQL

What is a GraphDB?

GraphDB

is an enterprise ready Semantic Graph Database developed by Ontotext and it is compliant with W3C Standards.

GraphDB is just one implementation, there is a lot of competition:

- Neo4J
- TerminusDB
- ArangoDB
- OpenRDF (previously Sesame)
- many other...

How to install GraphDB

- Download the package from <https://graphdb.ontotext.com>;
- Use Docker

```
$ docker run -d -p 127.0.0.1:7200:7200 ontotext/graphdb:10.1.1-arm64
```

If using ARM you need the proper image.

There is a *free version*, but also two proprietary license that include additional functionalities. For the course the free version is enough.

Concepts

- Database → Repository;
- Record → Node (aka Entity);
- Field → Triple;
- SQL → SPARQL;
- Table → Graph.

Hands On

Installation and configuration

1 GraphDB

2 **Dataset**

3 SPARQL

Datasets

- Documentation of the Dataset here (<https://platform.ontotext.com/semantic-objects/datasets/star-wars.html>)
- Dataset in the documentation or here (<http://shorturl.at/exLOP>)

Tricks

- GraphDB allows you to upload up to 200MB.

```
$ python -m SimpleHTTPServer 8081
```

```
$ python3 -m http.server -bind 127.0.0.1 8080
```

1 GraphDB

2 Dataset

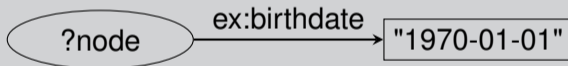
3 **SPARQL**

SPARQL

Definition

SPARQL is a *protocol* and a *declarative query language* for RDF.

Example



- Select a subgraphs that corresponds to the declaration;
- Uses pattern-matching.

Example Query

Example

```
PREFIX owl: <http://www.w3.org/2002/07/owl#>
PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
SELECT ?s
WHERE {
    ?s ?p ?o .
} LIMIT 100
```

- Preamble
- Action (SELECT, DESCRIBE, ASK, CONSTRUCT)
- Source
- Pattern
- Solution modifier (LIMIT, ORDER BY, OFFSET)

Query Pattern

- Basic Graph Pattern
- Group Graph Pattern
- Optional Graph Pattern
- Union Graph Pattern
- *Graph Graph Pattern*
- Constraint (FILTER BY)

Is *not* over!

SPARQL is a protocol! It can query remote knowledgegraphs, generate new entities, perform data migration and so on.

Cheatsheet (BASIC) → <https://shorturl.at/ejouR>

Full documentation → <https://www.w3.org/TR/sparql11-query/>



KGE - Knowledge Graph Engineering



Alessio Zamboni



Exploiting Knowledge Graphs
SPARQL and GraphDB