

Ingeniería de ontologías

Ontology-based data access

OBDA

Paradigma OBDA

Exponer vista conceptual de un dominio de negocio → **Ontología**

Abstraer de la complejidad de la fuente de datos → **BD relacional**

El usuario realiza consultas a nivel conceptual

Ontología ← **Mappings** → BD relacional

R2RML: lenguaje estándar (W3C) para especificar mappings

Ontop, MASTRO: frameworks que implementan OBDA

Paradigma OBDA - Arquitectura

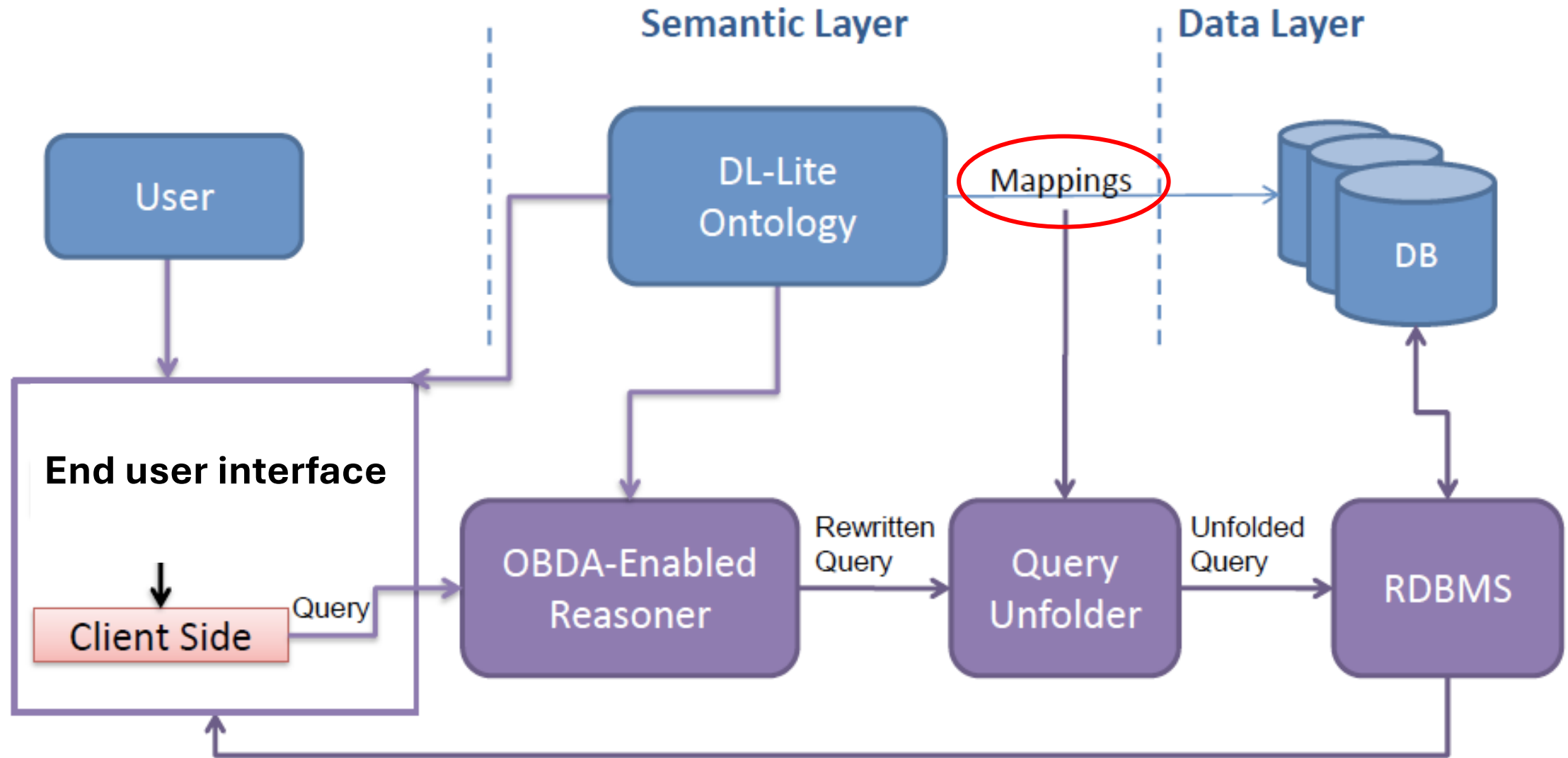
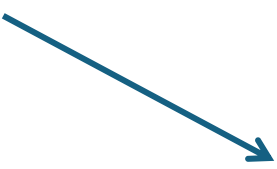


Figura tomada de: An Introduction to Ontology Engineering. C. Maria Keet. 2020. Capítulo 8.

Paradigma OBDA – Consulta de grafos RDF

Ontología



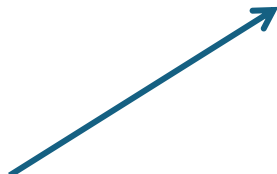
Virtual RDF graph



Consultas SPARQL

Se puede materializar

Mappings



OBDA – Ejemplo

bid	name	shared	type	rid
1	'Alice'	false	1	4
2	'Bob'	true	5	5

type 1-3:

hab. privadas 1 cama individual,
1 cama matrimonial, 2 camas individuales

type 4-5: hab compartidas

3 camas y 4 camas individuales

Private \sqsubseteq HotelRoom Shared \sqsubseteq HotelRoom HotelRoom \sqsubseteq Room

\exists bookedRoom.T \sqsubseteq Booking T \sqsubseteq \forall bookedRoom. Room

hasGuestName data property, hasType object property

En RDF:

:Private rdfs:subClassOf :HotelRoom :Shared rdfs:subClassOf :HotelRoom :HotelRoom rdfs:subClassOf :Room

:bookedRoom rdfs:domain :Booking :bookedRoom rdfs:range :Room

hasGuestName rdf:type DatatypeProperty hasType rdf:type ObjectProperty

Ejemplo tomado de: OBDA with the Ontop Framework. Diego Calvanese, Benjamin Cogrel, Elem Guzel Kalaci, Sarah Komla-Ebri, Roman Kontchakov, Davide Lanti, Martin Resk, Mariano Rodriguez-Muro, Guohui Xiao.

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```
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:bookedRoom rdfs:domain :Booking :bookedRoom rdfs:range :Room
hasGuestName rdf:type DatatypeProperty hasType rdf:type ObjectProperty
```

```
:bd/{bid} rdf:type :Booking <----- SELECT bid FROM tabla_booking
:bd/room/{rid} rdf:type :Private <----- SELECT rid, type FROM tabla_booking WHERE shared = false
:bd/room/{rid} rdf:type :Shared <----- SELECT rid, type FROM tabla_booking WHERE shared = true
:bd/{bid} :hasGuestName {name} <----- SELECT bid, name FROM tabla_booking
:bd/room/{rid} :hasType :4-Single-Beds <----- SELECT rid FROM tabla_booking WHERE type = 5
```

Mappings

Recuperar los nombres de huéspedes que
reservaron habitaciones con 4 camas:

```
SELECT ?name WHERE {
  ?c rdf:type :Booking .
  ?c :hasGuestName ?name .
  ?c :bookedRoom ?room .
  ?room :hasType :4-Single-Beds . }
```

movieontology (http://www.movieontology.org/2009/11/09/movieontology.owl) : [/User...

movieontology Actor

Individuals OWLViz DL Query **ontop Mappings** OntoGraf ontop SPARQL

Class hierarchy: G

- Thing
 - AcademicJourn
 - Activity
 - Actor**
 - Administrativel
 - AdultActor
 - Aircraft
 - Airline

Object property hierarchy

- ideology
- iftaAward
- illustrator
- incumbent
- industry

Datasource manager Mapping manager Mapping Assistant - BETA

Mapping editor:

Datasource selection
Select datasource: imdb-obda

Mapping manager
+ Create - Remove Copy Select all Select none

Actor
imdb:name/{person_id} a **dbpedia:Actor** .
select person_id from cast_info where
cast_info.role_id = 1

Actress
imdb:name/{person_id} a **mo2:Actress** .
select person_id from cast_info where
cast_info.role_id = 2

Mapping count: 69 Search:

To use the reasoner click Reasoner->Start reasoner Show Inferences

Bibliografía

Timea Bagosi, Diego Calvanese, Josef Hardi, Sarah Komla-Ebri, Davide Lanti, Martin Rezk, Mariano Rodríguez-Muro, Mindaugas Slusnys, Guohui Xiao. *The Ontop Framework for Ontology Based Data Access*. China Semantic Web Symposium (CMLS 2014).

Diego Calvanese, Benjamin Cogrel, Elem Guzel Kalaci, Sarah Komla-Ebri, Roman Kontchakov, Davide Lanti, Martin Resk, Mariano Rodriguez-Muro, Guohui Xiao. *OBDA with the Ontop Framework*. 23rd Italian Symposium on Advanced Database Systems (SEBD 2015).

Diego Calvanese, Giuseppe De Giacomo, Domenico Lembo, Maurizio Lenzerini. *The MASTRO system for ontology-based data access*. Semantic Web 2(1), 2011.

C. Maria Keet. *An Introduction to Ontology Engineering*. 2020. Capítulo 8.