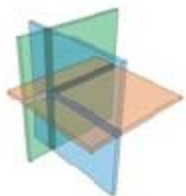


## Semantic Web and Multimedia

### - Query Languages -

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Requirements

Digest RDF

Digest OWL

Precise queries

Conjunctive queries

Similarity querying

...

„Standards“:

Sparql for RDF

Approaches:

OWL QL for OWL [Fikes]

Conjunctive queries for DL

More recent work by [Parsia et al07], [Kubias et al, 07]

Recommendation (since early 2008)

SPARQL is a query language for getting information from such RDF graphs. It provides facilities to:

- ◆ extract information in the form of URIs, blank nodes, plain and typed literals.
- ◆ extract RDF subgraphs.
- ◆ construct new RDF graphs based on information in the queried graphs.

There is also remote access protocol: SPROT

Data:

```
<http://example.org/book/book1>  
    <http://purl.org/dc/elements/1.1/title>  
"SPARQL Tutorial"
```

Query:

```
SELECT ?title  
WHERE
```

```
{  
<http://example.org/book/book1> <http://purl.org/dc/elements/1.1/title> ?title .  
}
```

Query Result:

Triple pattern

title
"SPARQL Tutorial"

```
PREFIX dc: <http://purl.org/dc/elements/1.1/>
SELECT ?title
WHERE
{
  <http://example.org/book/book1> dc:title ?title
}
```

```
BASE <http://example.org/book/>
PREFIX dc: <http://purl.org/dc/elements/1.1/>
SELECT $title
WHERE
{
  <book1> dc:title ?title
}
```

```
PREFIX dc: http://purl.org/dc/elements/1.1/
PREFIX : <http://example.org/book/>
SELECT $title
WHERE
{
  :book1 dc:title $title
}
```

```
BASE <http://example.org/book/>
PREFIX dcore: <http://purl.org/dc/elements/1.1/>
SELECT ?title
WHERE
{
  <book1> dcore:title ?title
}
```

Data:

```
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
_:a foaf:name "Johnny Lee Outlaw" .
_:a foaf:mbox
<mailto:outlaw@example.com> .
_:b foaf:name "A. N. Other" .
_:b foaf:mbox
<mailto:other@example.com> .
```

Query:

```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
SELECT ?mbox
WHERE
{
  ?x foaf:name "Johnny Lee Outlaw" .
  ?x foaf:mbox ?mbox
}
```

Query Result:

<b>mbox</b>
<mailto:outlaw@example.com>

## Data:

```
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
@prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
_:a rdf:type foaf:Person .
_:a foaf:name "Alice" .
_:a foaf:mbox <mailto:alice@example.com> .
_:a foaf:mbox <mailto:alice@work.example> .
_:b rdf:type foaf:Person .
_:b foaf:name "Bob" .
```

## Query:

```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
SELECT ?name ?mbox
WHERE
{
    ?x foaf:name ?name .
    OPTIONAL { ?x foaf:mbox ?mbox }
}
```

## Query Result:

name	mbox
„Alice“	<mailto:alice@example.com>
„Alice“	<mailto:alice@work.example>
„Bob“	

## Data:

```
@prefix foaf: <http://xmlns.com/foaf/0.1/> .
_:a foaf:givenname "Alice" .
_:a foaf:family_name "Hacker" .
_:b foaf:firstname "Bob" .
_:b foaf:surname "Hacker" .
```

## Result:

```
@prefix vcard:
  <http://www.w3.org/2001/vcard-rdf/3.0#>
_:v1 vcard:N      _:x .
_:x vcard:givenName "Alice" .
_:x vcard:familyName "Hacker" .
_:v2 vcard:N      _:z .
_:z vcard:givenName "Bob" .
_:z vcard:familyName "Hacker" .
```

## Query:

```
PREFIX foaf: <http://xmlns.com/foaf/0.1/>
PREFIX vcard:
  <http://www.w3.org/2001/vcard-rdf/3.0#>
CONSTRUCT
{
  ?x vcard:N _:v .
  _:v vcard:givenName ?gname .
  _:v vcard:familyName ?fname
}
WHERE
{
  UNION
  { ?x foaf:firstname ?gname }
  UNION
  { ?x foaf:givenname ?gname } .
  { ?x foaf:surname ?fname }
  UNION
  { ?x foaf:family_name ?fname } .
}
```

Boolean combinations

Testing for types (e.g. datatypes)

Regular expressions

Comparisons (corresponding to datatype, e.g. integer comparison)

External function texting (function named by IRI)

Kemafor Anyanwu, Angela Maduko, Amit P. Sheth: SemRank: ranking complex relationship search results on the semantic web. WWW 2005: 117-127

Nenad Stojanovic: On Analysing Query Ambiguity for Query Refinement: The Librarian Agent Approach. ER 2003: 490-505

Fikes, R.; Hayes, P.; & Horrocks, I. OWL-QL - A Language for Deductive Query Answering on the Semantic Web. Knowledge Systems Laboratory, Stanford University, Stanford, CA, 2003.  
[ftp://ftp.ksl.stanford.edu/pub/KSL\\_Reports/KSL-03-14.pdf.gz](ftp://ftp.ksl.stanford.edu/pub/KSL_Reports/KSL-03-14.pdf.gz)

Parsia et al. In: Proc. OWL-ED 2007 workshop

Kubias, Staab, Pan. In: Proc. OWL-ED 2007 workshop

**Thank You**