Relationale Datenbanken als RDF-Speicher

Rows vs. Columns

- Tripel-Table
- Property-Table
- Vertical Partitioning

Tabellenstrukturen für RDF

Triple-Table

subject	predicate	object
s1	a1	o1
s1	a2	o2
s2	a1	o1
s3	a1	o3
s3	a2	o4
s3	a3	o5
.	.	.
.	.	.
.	.	.

Property Table - single class

Class A

subject	a1	a2	a3	...	an
s1	o1	o2	null		...
s2	o1	null	null		...
s3	o3	o4	o5		...
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.

.
.
.

Class X

subject	x1	x2	x3	...	xm
s4	o6	o11	o2		...
s9	o3	o13	null		...
s11	o7	null	o1		...
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.

Property Table - multiple types

subject	type	b1	b2	y1	y2 ...
s1	B	o1	o2	null	o3 ...
s2	B	o1	null	null	o8 ...
s3	Y	null	o4	o5	o2 ...
s5	Y	null	null	o8	o7 ...
.	.	.	.	.	. .
.	.	.	.	.	. .
.	.	.	.	.	. .

Vertical Partitioning

Property a1

subject	object
s1	o1
s2	o1
s3	o3

Property a2

subject	object
s1	o2
s3	o4

Property a3

subject	object
s3	o5

.
.
.

Property an

subject	object
...	...

Example 1a: In which years have database books been published?

Query in SPARQL over RDF-Graph

```
SELECT ?year WHERE {
    ?book type Book .
    ?book title "DBMS" .
    ?book issued ?year
}
```

Query in SQL over Triple-Table

```
SELECT T3.object AS year FROM Triple-Table T1,
     Triple-Table T2,
     Triple-Table T3
WHERE
  T1.predicate = 'type' AND T2.predicate = 'title' AND
  T3.predicate = 'issued' AND
  T1.object = 'Book' AND T2.object = 'DBMS' AND
  T1.subject = T2.subject AND T2.subject = T3.subject
```

Example 1b In which years have database books been published?

Query in SPARQL over RDF-Graph

```
SELECT ?year WHERE {
    ?book type Book .
    ?book title "DBMS" .
    ?book issued ?year
}
```

Query in SQL over Property-Table

```
SELECT year FROM Property-Table WHERE
  type = 'Book' AND title = 'DBMS'
```

Example 1c In which years have database books been published?

Query in SPARQL over RDF-Graph

```
SELECT ?year WHERE {
    ?book type Book .
    ?book title "DBMS" .
    ?book issued ?year
}
```

Query in SQL over Vertical Partitioning

```
SELECT Is.object AS year FROM Type Ty,
     Title Ti,
     Issued Is
WHERE
  Ty.object = 'Book' AND
  Ti.object = 'DBMS' AND
  Ty.subject = Ti.subject AND Ti.subject = Is.subject
```

Example 2: In which predicates do persons appear as objects?

Query in SPARQL over RDF-Graph

```
SELECT ?predicate WHERE {
    ?person rdf:type foaf:Person .
    ?subject ?predicate ?person
}
```

Query in SQL over Triple-Table

```
SELECT T2.predicate FROM Triples T1,
     Triples T2
WHERE
  T1.predicate='Type' AND T1.object='Person' AND
  T2.object = T1.subject
```

Property-Table (single class) and Vertical Partitioning are going to fail.