

Relationship notations



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Refined Design principles of Identity Relationship Management

- **Provable**
The existence of a given relation must be provable.
- **Constrainable**
either part of the relation must be able to set a constraint on the use of the relationship.
- **Mutable**
relationships might change, or be forever (A was made by B).
- **Revocable**
The ending and revocation of relations.
- **Delegable**
Changing the actors.
- **Scalable**
be able to scale up to the very top of the view.

See WG Doc on Identity Relationship Management
<https://kantarainitiative.org/groups/irm/>

The onward journey

- Relationship Manager
 - Hard for the entities in a relation to manage their relation themselves.
 - Need for a managing ,instance‘ to orchestrate.
- Relationship Notation
 - Standardized method to represent relationships.

Notation ,Language‘

- Notations
 - A system of [...] used to represent and express [...] facts.
- Language
 - A system of [...] used to represent and express [...] facts.

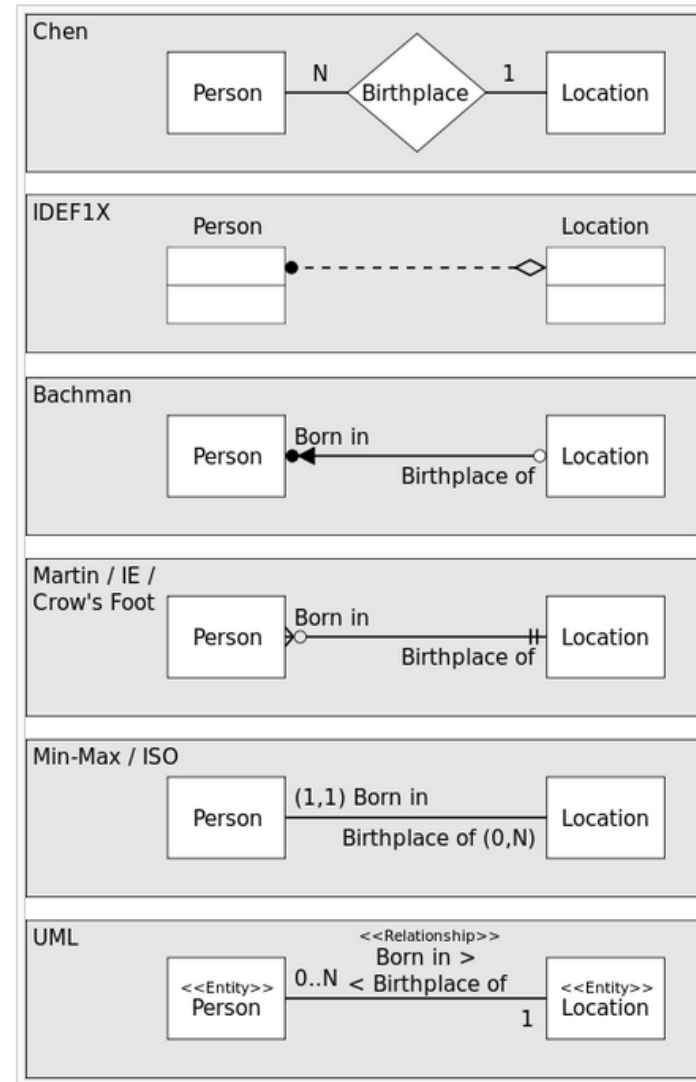
,Notation Language‘ is a ,tautology‘

On Entity Relations

- Entity relation models are quite common in DB Design
- Q: Why do we need something new?
- A: Disconnected Entities!

On ER Models

- Graphical Notation
- Great for humans
- Hard for machines



Requirements Relation Notation

- Support the six design principles.
- Machine-interpretable and human-understandable.
- Support disconnected and remote entities, concepts and domains.
- Standard oriented.

Symbols, Objects and concepts

- Allow sender and receiver to ,understand‘

This lightbulb is made by ACME Corporation

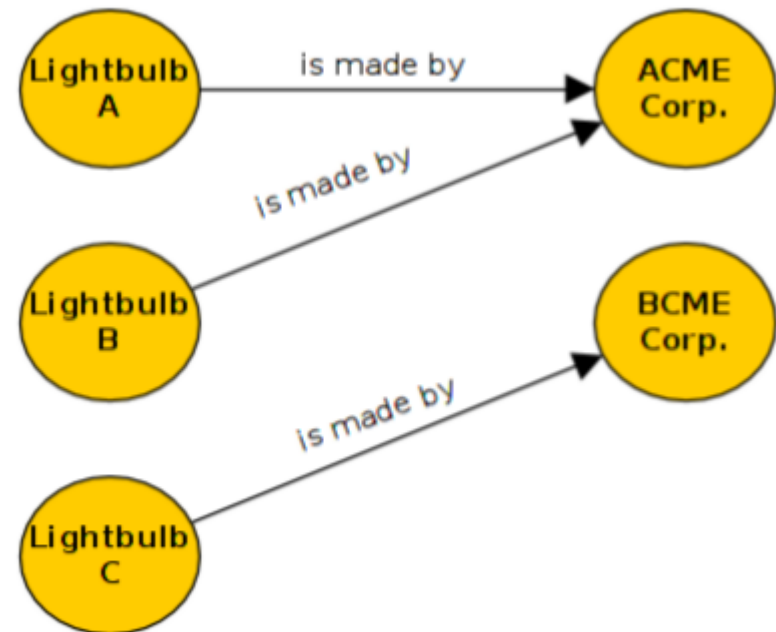
This lightbulb is made by ACME Corporation
subject predicate object

lightbulb:A is_made_by Corporation:ACME

- What means ,lightbulb‘ or ,is_made_by‘ ?

Graphs

- Graph Theory
- Describes a relation between a subject and an object.
- Nodes (vertices, points)
- Edges (lines, arcs)



A Graph Notation

```
@prefix lb: <http://notationexamples.irm/lightbulb#> .
@prefix co: <http://notationexamples.irm/company#> .
@prefix pre: <http://notationexamples.irm/relations#> .
```

Uniform Resource Identifier

three lightbulbs made by two different companies

```
lb:A pre:is_made_by co:ACME .
lb:B pre:is_made_by co:ACME .
lb:C pre:is_made_by co:BCME .
```

Resource Description Framework

- W3C Specification from 1999
- making statements about uniquely identifiable resources in the form of ,subject-predicate-object', also known as ,triple'.
- URI (IRI) bounds it to namespaces
- Namespaces can serve as ,concept domain'

Vocabularies and Ontologies

- OWL (Web Ontology Language)
- Built on top of RDF

```

01 @prefix lb: <http://notationexamples.irm/lightbulb#> .
02 @prefix co: <http://notationexamples.irm/company#> .
03 @prefix pre: <http://notationexamples.irm/relations#> .
04 @prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#> .
05 @prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#> .
06 @prefix owl: <http://www.w3.org/2002/07/owl#>
07
08 # three lightbulbs made by two different companies
09
10 lb:A pre:is_made_by co:ACME .
11 lb:B pre:is_made_by co:ACME .
12 lb:C pre:is_made_by co:BCME .
13
14 #describing the predicate ,is_made_by‘
15 pre:is_made_by rdf:type rdf:Property .
16 pre:is_made_by rdf:comment „the relation between a product and its producer“ .
17 pre:is_made_by rdf:type owl:SymetricProperty .
18 pre:has_produced owl:inverseOf pre:is_made_by .

```

Query Language

- SQL is widely known
- SPARQL is the equivalent for ,triplestore‘ systems, aka ,Graph-Databases
- Allows for implicit and explicit queries

```
$ cat lb.rq
prefix lb: <http://notationexamples.irm/lightbulb#>
prefix co: <http://notationexamples.irm/company#>
prefix pre: <http://notationexamples.irm/relations#>
prefix rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
prefix rdfs: <http://www.w3.org/2000/01/rdf-schema#>
prefix owl: <http://www.w3.org/2002/07/owl#>

SELECT ?lightbulb WHERE {?lightbulb pre:is_made_by co:ACME .}

| lightbulb |
| lb:A      |
| lb:B      |
```

Query Language vs Notation

- SPARQL as query language, RDF/OWL as notation
 - standardized
 - machine interpretable (and still human readable with the help of ontologies)
 - supports disconnection (by caching the remote ontological definitions)
 - with the use of ontologies, it can provide any of the identified principles for IRM

Thank you!

Join the Working Group

<https://kantarainitiative.org/groups/irm/>