



Human-Computer Interaction Center

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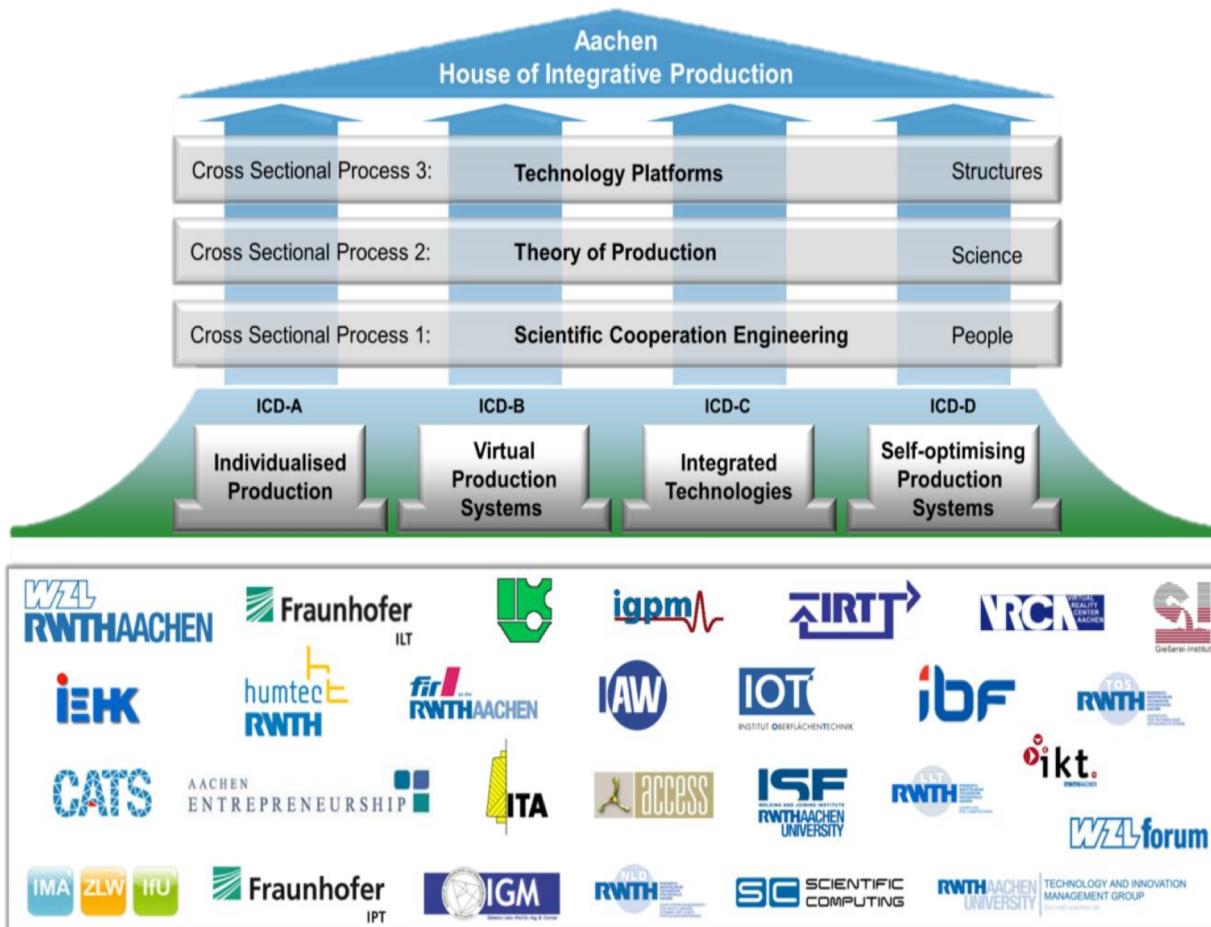


An open-source object-graph mapper for neo4j and scala: renesca

<https://github.com/renesca/renesca-magic>

Felix Dietze, Johannes Karoff, André Calero Valdez, Christoph Greven, Ulrik Schroeder, Martina Ziefle

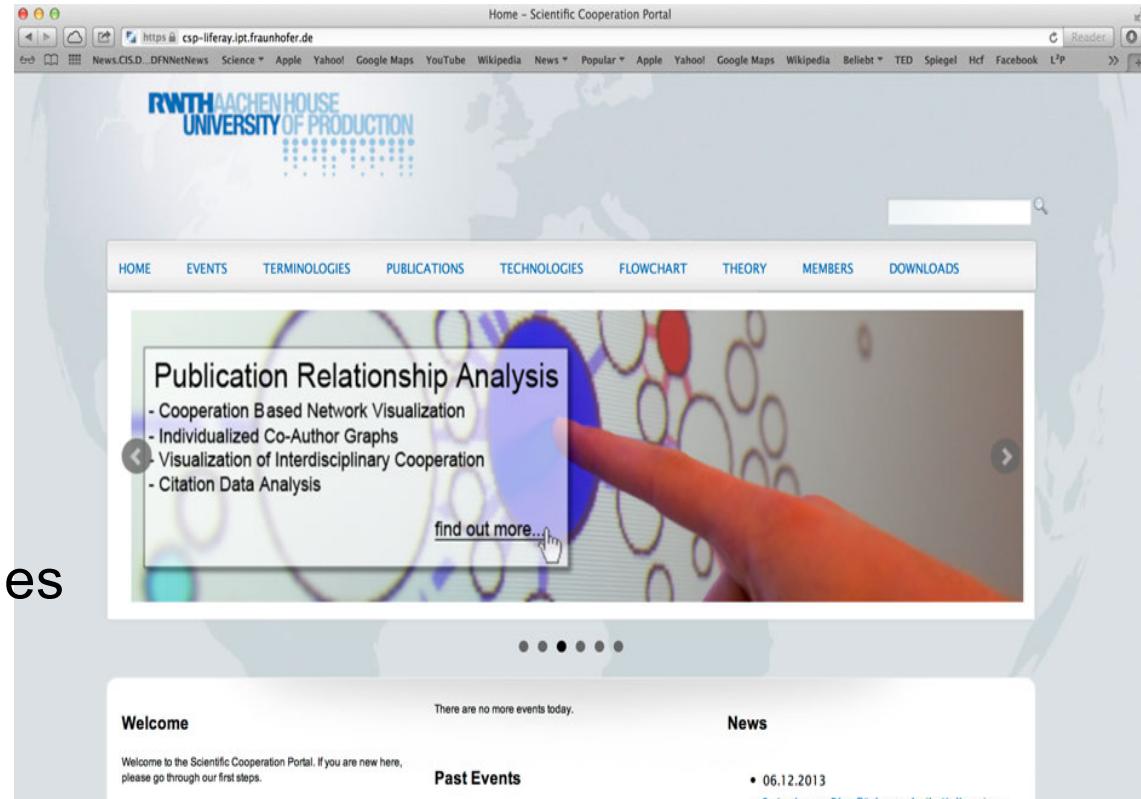
Research: Integrative Production Technology



- 4 Integrated Cluster Domains
- 3 Cross Sectional Processes
- 180 Researchers from 40 institutes

Scientific Cooperation Portal

- Social Portal
 - Centralized means of administration
 - Central data storage
 - User profiles
 - Method competencies
 - Publication lists
 - Interdisciplinary support
 - Interdisciplinary glossaries
 - Project planning
 - Technology transfer



Our Task: Graph-based Discussion System

- Argument mapping
 - NEO4J (fast GDB)
 - Graph visualization using D3.js
-
- How to manage hyper-edges?

Why use Scala?

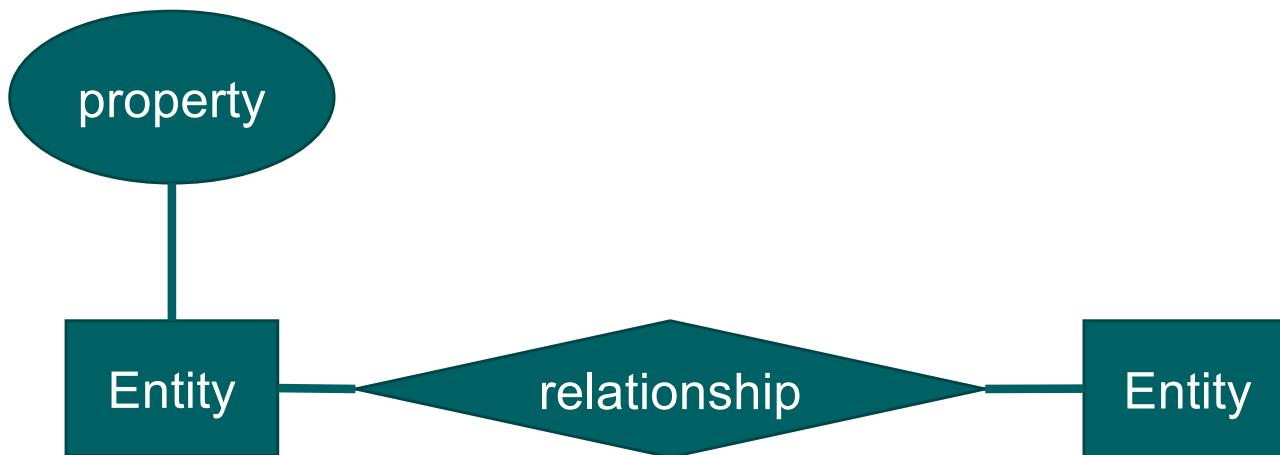
- **JVM compatible**
- **Makros**
- **Multiple Inheritance (traits)**
- **Other benefits (functional programming benefits)**

Impedance Mismatch Graph OO

- **OO Programming**
 - Fits mental model
 - type-safety (syntax checking)
 - Inheritance (code reuse)
 - encapsulation (prevent side-effects)
 - Etc.
- **Graph-DB – Efficient Graph Traversal**
 - Graph-based data structure
 - Local Neighborhood over Indexed-Search
 - Use-Case dependent

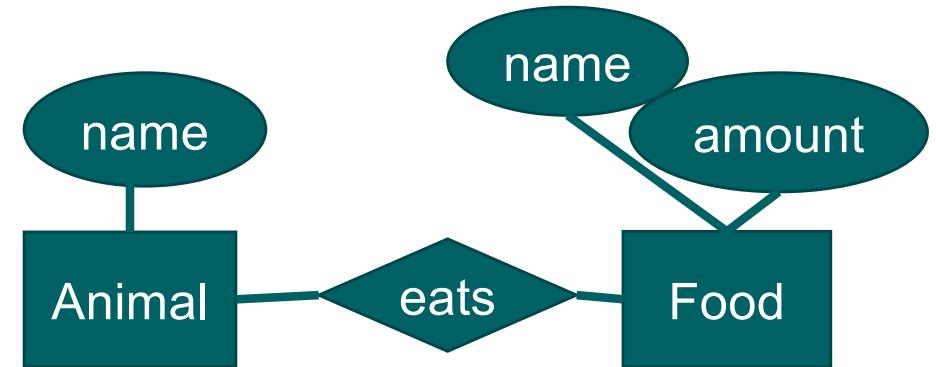
How to define DB-Models

ER-Diagrams



Scala-DSL for ER-Model

DSL – Domain Specific Language



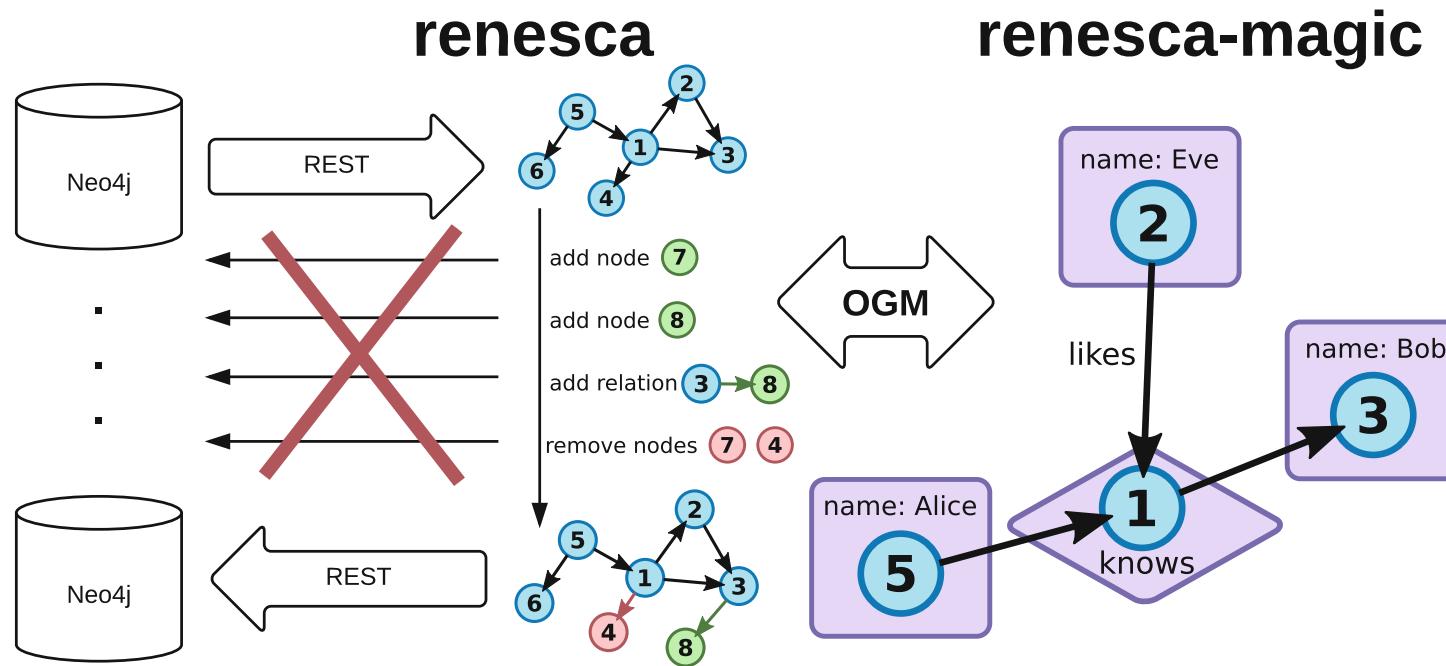
```
@Node class Animal { val name: String }
@Node class Food {
  val name: String
  var amount: Long
}

@Relation class Eats(startNode: Animal, endNode: Food)
```

- **Boilerplate classes and factories (Nodes, Relations, Graphs)**
 - getters, setters and factories for properties (type-safety)
- **Boilerplate for Hyperrelations**
- **Node and Relation traits for labels and properties**
 - functionality for free
- **Accessors for neighbors on Nodes, over Relations and Hyper-Relations**
- **Filtered set accessors for Nodes, Relations and traits in a Graph**
 - Query

Overview of Renesca

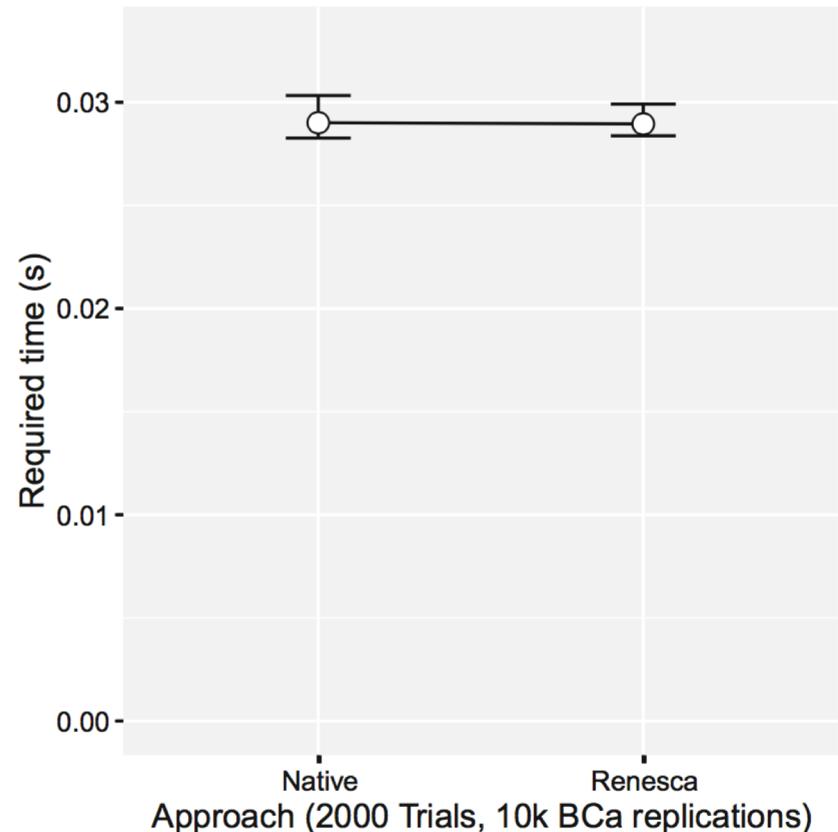
Transactions and OGM



Very Simple Benchmark

Comparison of inserting data

- Comparing runtimes of simple queries
- Not extensive
 - No large data model
 - No complex transactions
- Open-Source



LiveDemo in Scala REPL

Usage of renesca-magic

What is staged?

- Basic schema-definition
- Load Schema definition in REPL

- <https://github.com/renesca/renesca-magic> (Examples and Tutorial)
- Problem? -> Issues!