



Semantic Evaluation at Large Scale Tutorial

Evaluating Ontology Matching Tools

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Who is that?

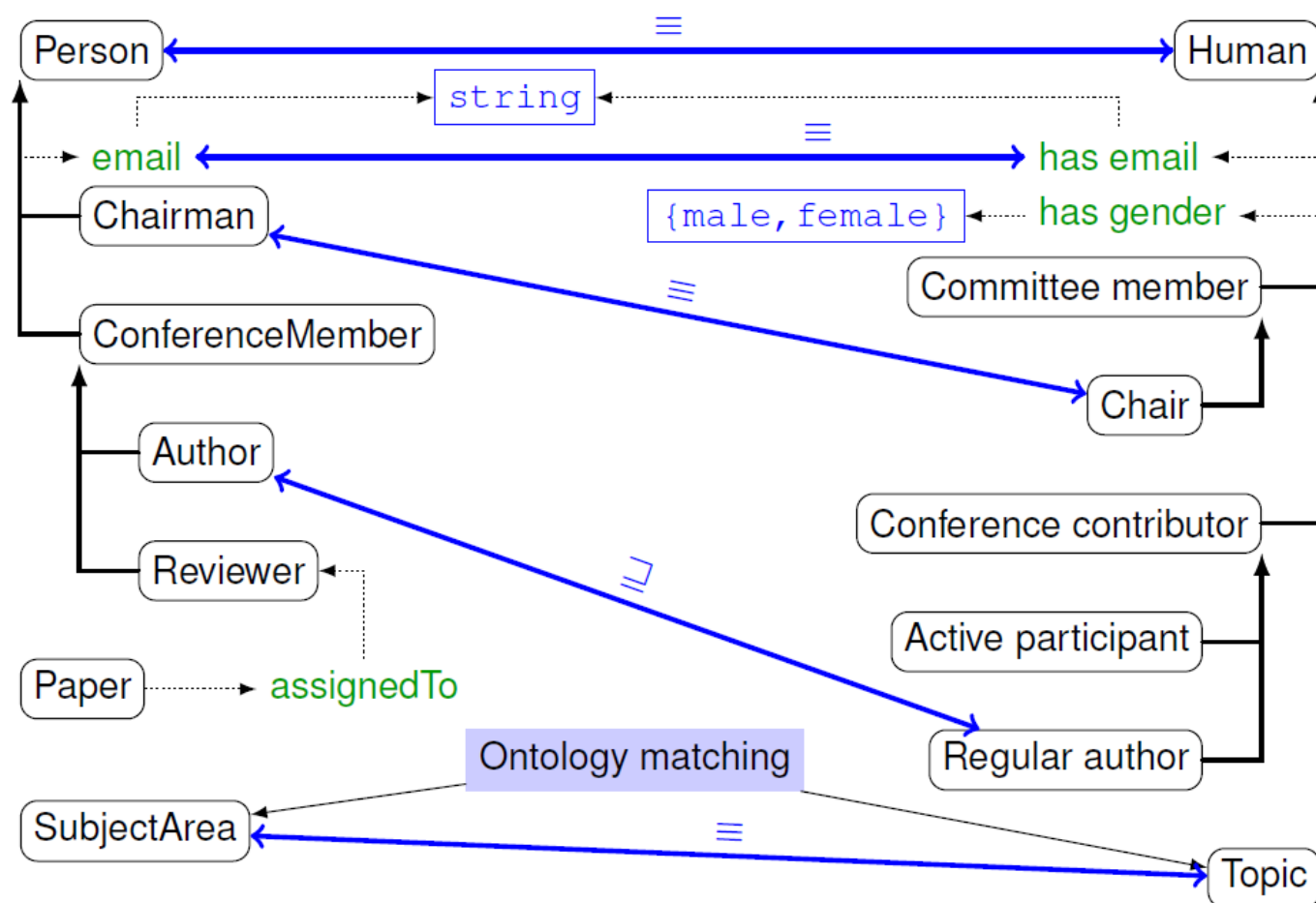
- Christian Meilicke
- OAEI co-organizer since 2007
- Involved in development of CODI matching system
- Research Topic: Reasoning with Ontology Alignments
- Interested in the Evaluation of Semantic Technologies



Outline

- **Background on Ontology Matching**
- Metrics for evaluating Matching Systems
- OAEI Datasets and Scenarios
- Webbased & Platformbased Evaluation
- Using the Evaluation Service
- Plans for OAEI 2011

Ontology Matching



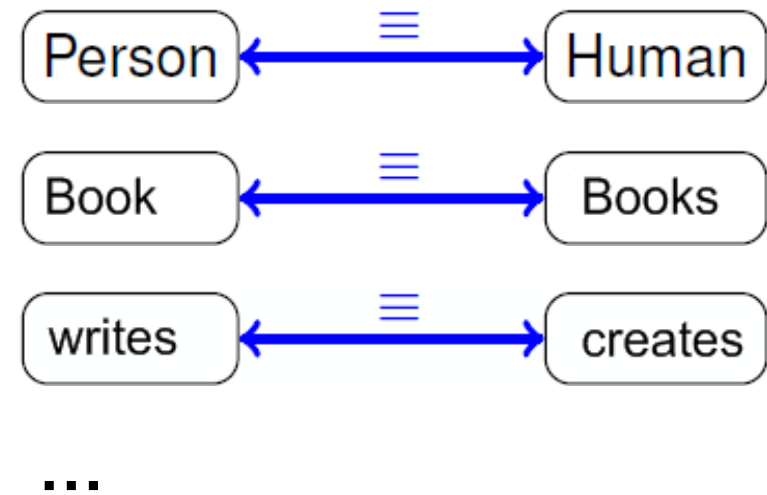
Terminology

- **Correspondence**
- Alignment
- Reference Alignment
- Matching System (Matcher)
- OAEI (Ontology Alignment Evaluation Initiative)



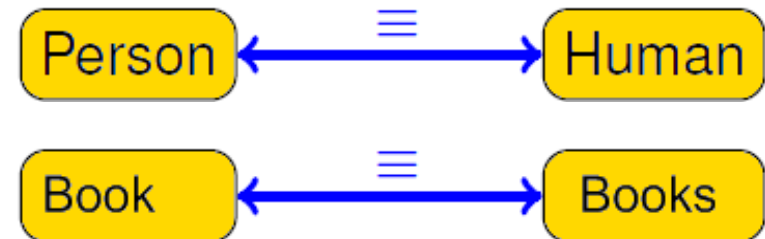
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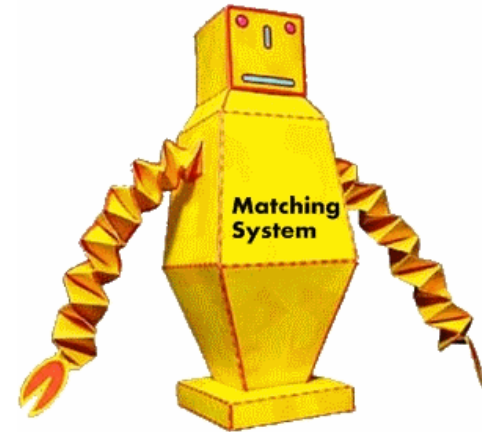
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OAEI

- Goals of the OAEI
 - assessing strength and weakness of matching systems
 - comparing performance of techniques
 - increase communication among algorithm developers
 - improve evaluation techniques
 - improving the work on ontology alignment/matching.
- Procedure of OAEI
 - Annual evaluation campaign at ISWC ontology matching workshop
 - divided in several tracks
 - a track comprises a dataset and a bunch of evaluation methods
 - each track conducted by a group of researchers
 - very vivid community / participation
 - *non-automized approach to ontology alignment evaluation*

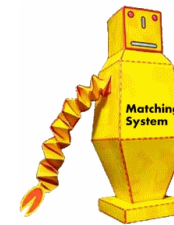
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Compliance-based Metrics

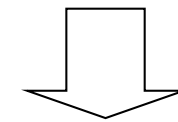
- Based on comparing generated alignment A vs. reference alignment R
- Precision, recall, and f-measure (harmonic mean of precision and recall)

$$P(A, R) = \frac{A \cap R}{A} \quad R(A, R) = \frac{A \cap R}{R}$$



Person = Person A
writtenBy = hasWritten
FirstAuthor < Author

Person = Person R
FirstAuthor < Author
Paper = Article
Document = Contribution



$$P(A, R) = 2 / 3 = 0.33$$

$$R(A, R) = 2 / 4 = 0.5$$

Other Metrics

- Efficiency
 - Runtime and memory consumption
- Scalability
 - On top of efficiency
- Conformance to standards
 - Alignment API, format of input ontologies, ...
- Coherence of alignments
 - Unsatisfiability as a result of using the alignment

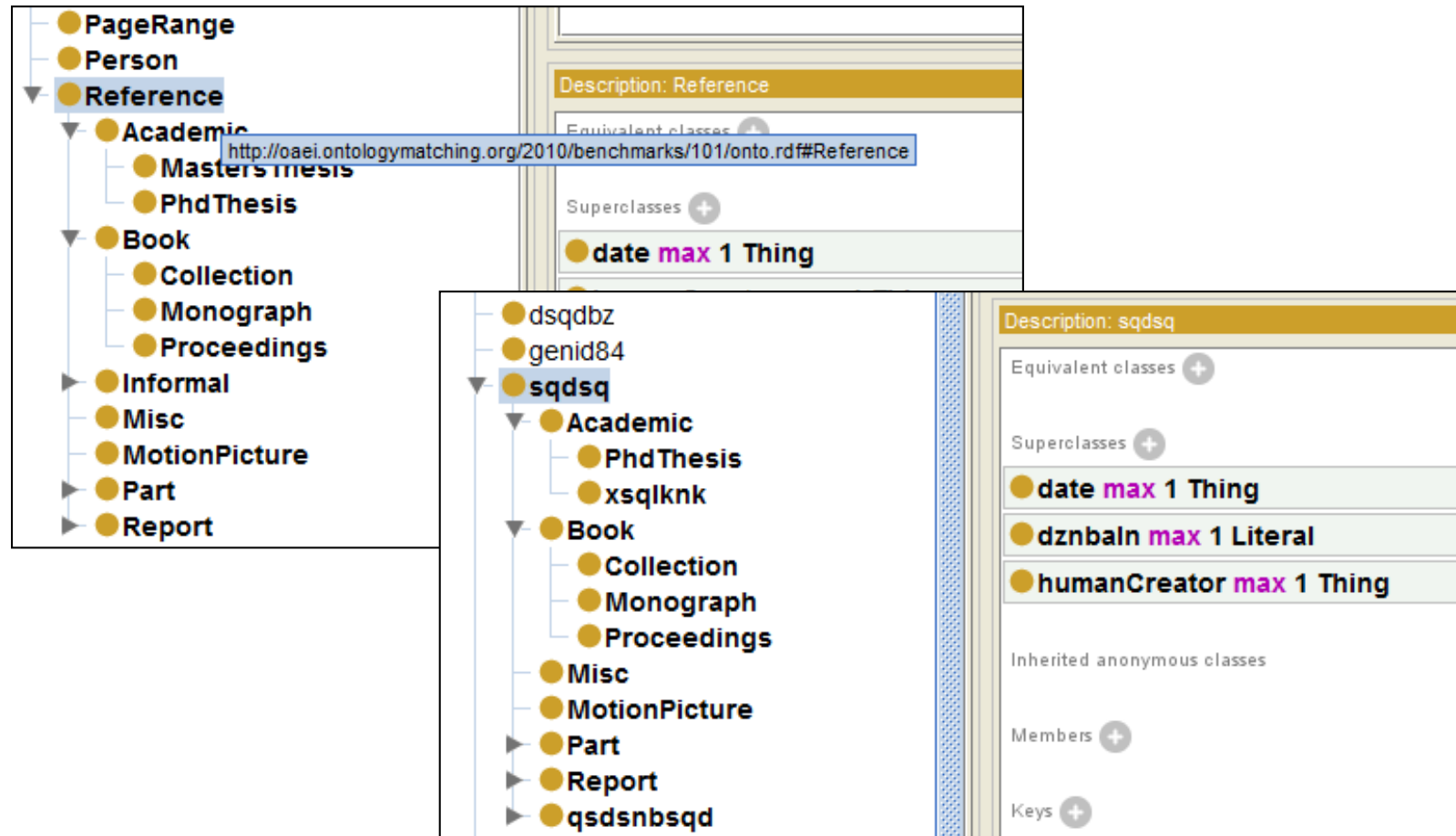
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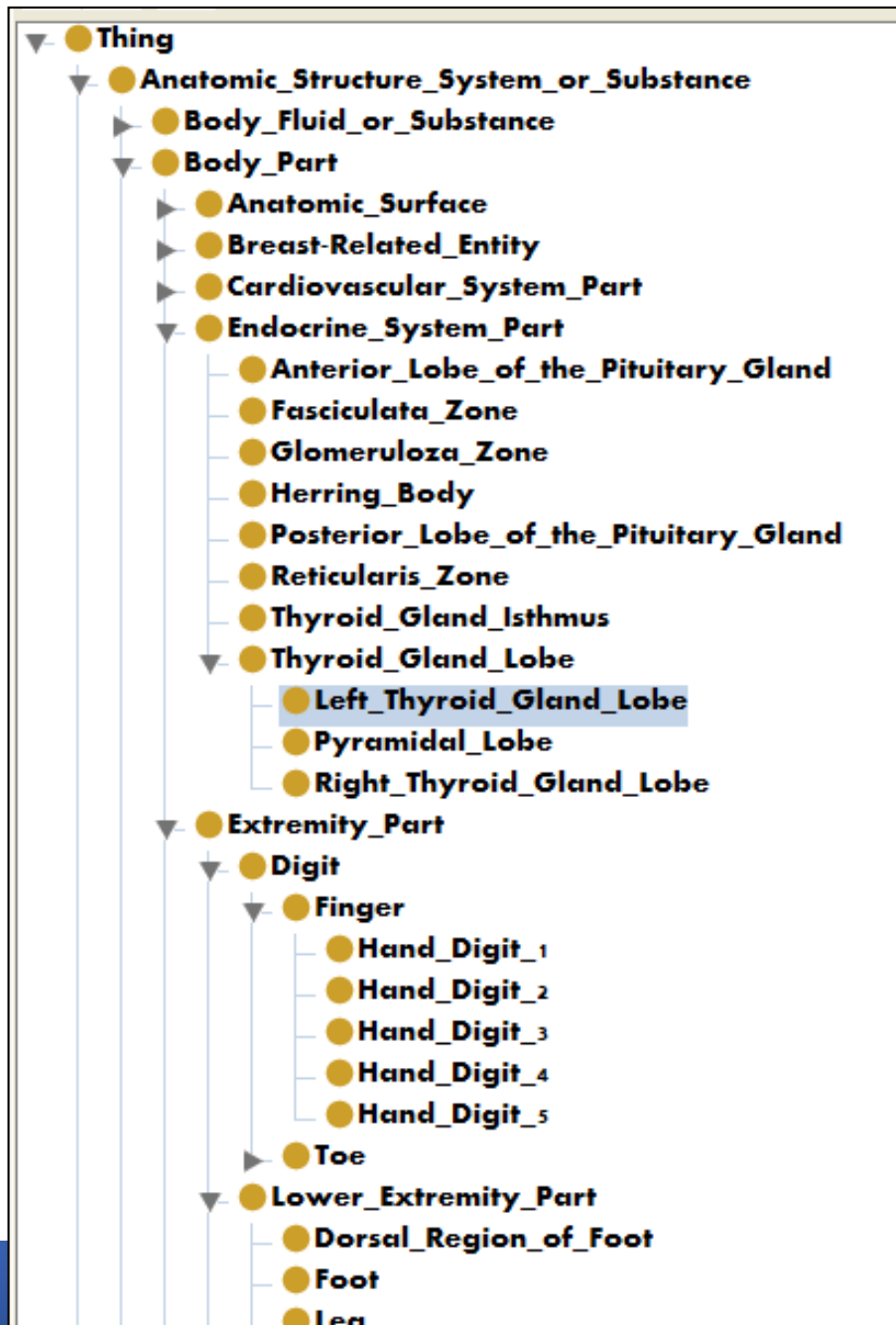
Important Datasets from OAEI

- Benchmark
 - More than 50 testcases, one ontology (33 named classes, 24 object properties, 40 data properties) has to be matched on systematic, artificially generated variations
- Anatomy
 - Two ontologies from biomedical domain (approx. 3000 classes, more than 1000 correspondences in R)
- Conference
 - Several ontologies from conference domain (30-200 classes), reference alignment between all pairs from a subset of 7 ontologies

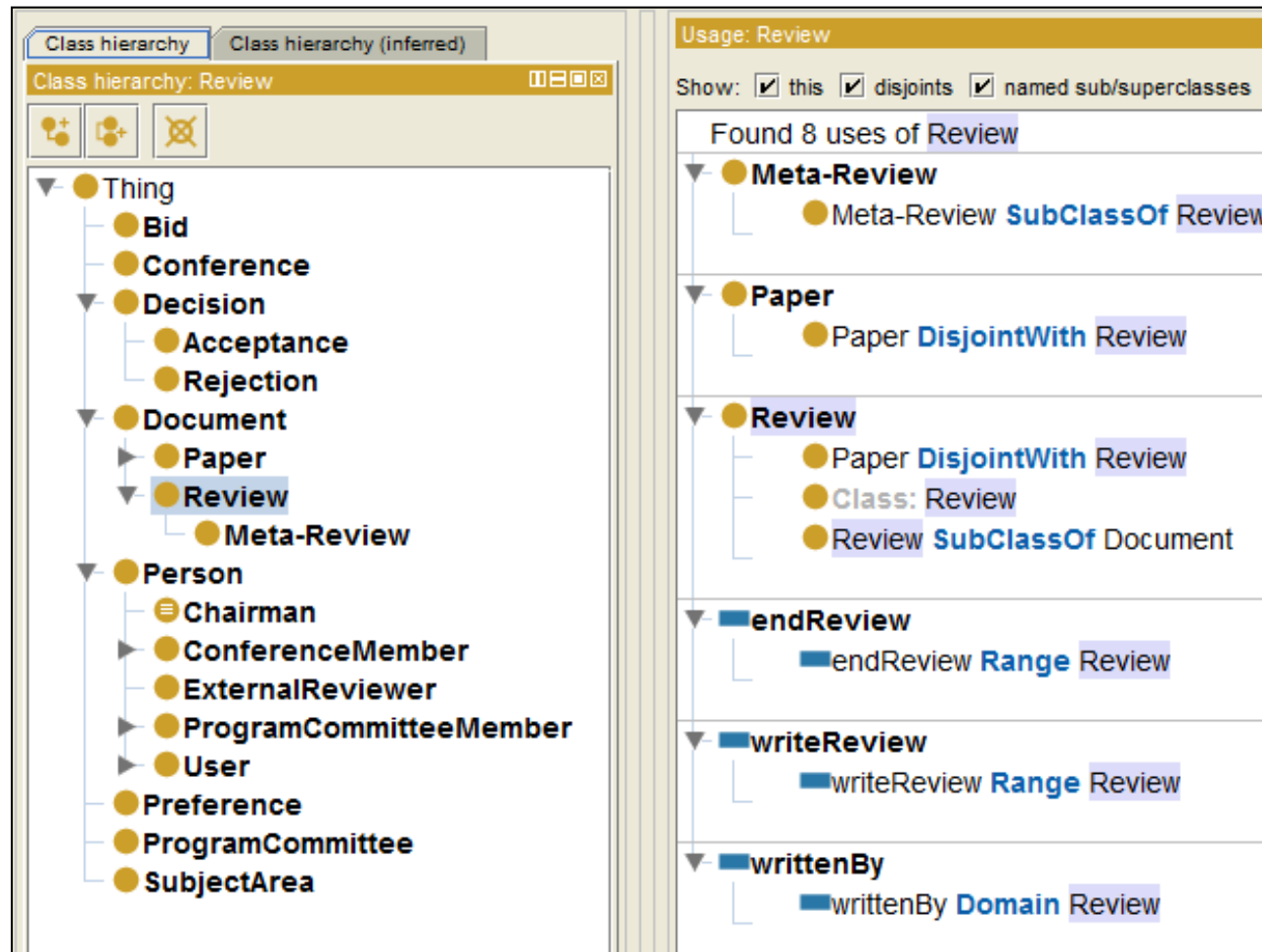
Benchmark (#249-2)



Anatomy (human)



Conference (CMT)



Metrics applied in 2010

- **Precision, recall, f-measure**
- **Conformance** (indirectly)
- **Coherency** (in subsequent experiments)
- **Runtime measurements (Efficiency/Scalability)**
- **Deployability**
- Important aspect on meta-level:
 - **Reproducibility of results!**

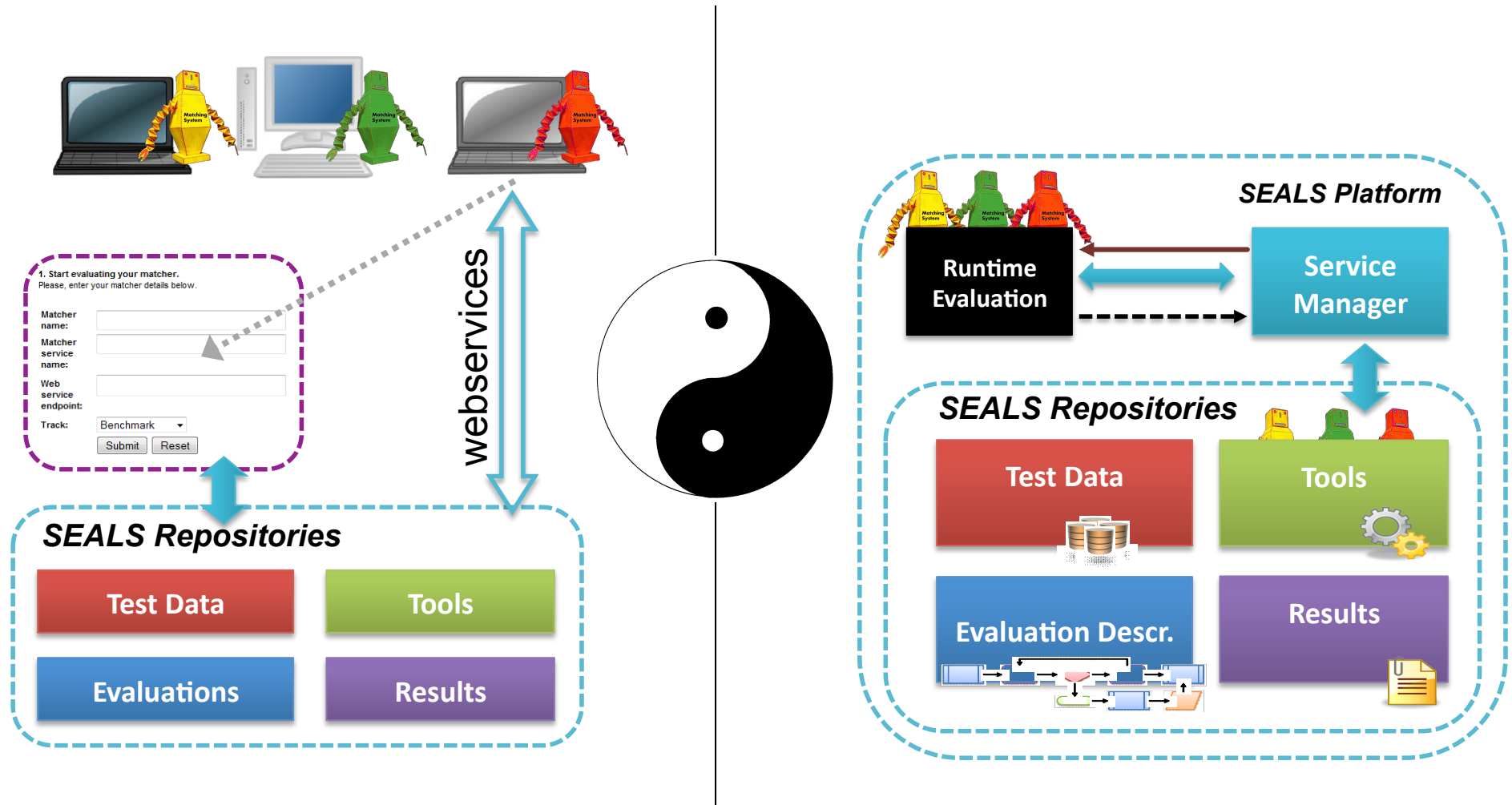
OAEI 2010 Results

Links and references on the last slide!

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- Using the Evaluation Service
- Plans for OAEI 2011: Using the platform based evaluation

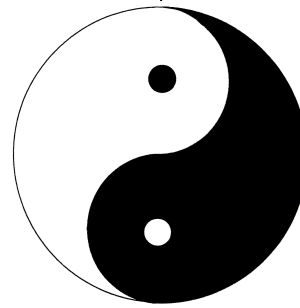
Two Approaches



Pros and Cons

Webbased approach

- Used in OAEI 2010
- Low barrier of usage
- Configuration/modifications can be tested on the fly
- No reproducibility of results
- No efficiency measurement possible



Platformbased approach

- Will be used in OAEI 2011
- Requires to upload tool
- Harder to test different configurations/modifications
- Results are attached to a certain version, can be reproduced any time
- Runtime measurements possible

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Using the Webbased Evaluation Service

DEMO

<http://www.seals-project.eu/ontology-matching-evaluation-ui>

Using a Client to simulate deployment in the Platform

DEMO

currently under construction

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Plans for OAEI 2011

- OAEI 2011 at OM-workshop at ISWC 2011
- Support both approaches
 - Offer online evaluation service for preliminary testing
 - Run tools in platform for generating final results
 - Documentation for tool wrapping
 - Offer continous tests (semi-automatically conducted)
 - Use experiences for a fully automized approach
- More datasets under SEALS
 - OAEI diretory track
 - New track proposed by Prateek Jain et al. on Matching Linked Open Data Schemas

- Resources:

- <http://oaei.ontologymatching.org/>
links to the current and previous OAEI campaigns
- <http://www.seals-project.eu/ontology-matching-...>
tutorial for wrapping a matcher to be executed on the platform, **currently under construction**
- <http://www.seals-project.eu/ontology-matching-evaluation-ui>
user interface of the online evaluation service
- christian@informatik.uni-mannheim.de
feel free to ask any related questions at any time

- References:

- Euzenat et al.: Results of the ontology alignment evaluation initiative 2010, OM-2010
comprehensive overview on OAEI 2010 results
- Trojahn et al.: Automating OAEI Campaigns (First Report), IWEST-2010
about using the online evaluation service in OAEI 2010

Thanks for
your attention!

