

Information Interpretation and Integration Conference

Evaluation of Ontology Tools Workshop Ontology Alignment Contest



Todd Hughes



Jerome Euzenat

Information Interpretation and Integration Conference (I³CON)



- **Semantic integration research community resembles the text retrieval community of years ago**
 - Critical mass of globally distributed research programs
 - Large variety of technical approaches
 - Generally, but not universally, accepted metrics
 - No meaningful basis of evaluating one technical approach over another
- **The success of text retrieval technology was due in large measure to the Text Retrieval Conference (TREC)**
 - Promoted well-defined concepts for measuring success
 - Clarified metrics
 - Established realistic benchmarks
 - Created canonical challenge problems

I³CON was an ontology alignment experiment and workshop organized on the TREC model.

I³CON and the TREC Model



1. **Define the metrics**
 - Precision, Recall, fMeasure
2. **Develop experiment format for easy participation by researchers**
 - Ontology Alignment Ontology
3. **Create development data sets and test data sets; publish the former**
 - 2 development ontology pairs; 8 test ontology pairs
4. **Distribute test data sets to experiment participants**
 - 5 participants
5. **Collect automatically generated results data**
 - Most participants submitted alignment data for all ontology pairs
6. **Collate and compare results data**
7. **Hold assessment workshop and end of cycle**
 - I³CON @ PerMIS

I³CON: Timeline

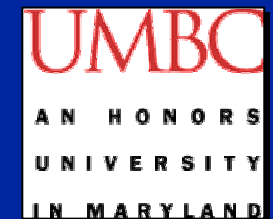


- **March 2004:** Met with NIST, “pilot” conference as Performance Metrics for Intelligent Systems (PerMIS) special session proposed
- **March-June 2004:**
 - Formed Organizational Committee
 - Recruited participants
 - Created ontology alignment format
 - Developed test ontology pairs
 - **May 25:** I³CON briefing at DAML PI Meeting
- **June 15 2004:** Released test ontology pairs
- **July 16, 2004:** Collected alignment results data
- **July 16-August 20, 2004:** Compiled results data
- **August 25, 2004:** I³CON special session at PerMIS

I³CON: The Event



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- **Experiment Participants**

Jerome Pierson (INRIA)

John Li (Teknowledge)

Lewis Hart (AT&T)

Marc Ehrig (University of Karlsruhe)

Todd Hughes (LM ATL)

- **Guest Speakers**

Bill Andersen (Ontology Works)

Mike Pool (Information Extraction and Transport)

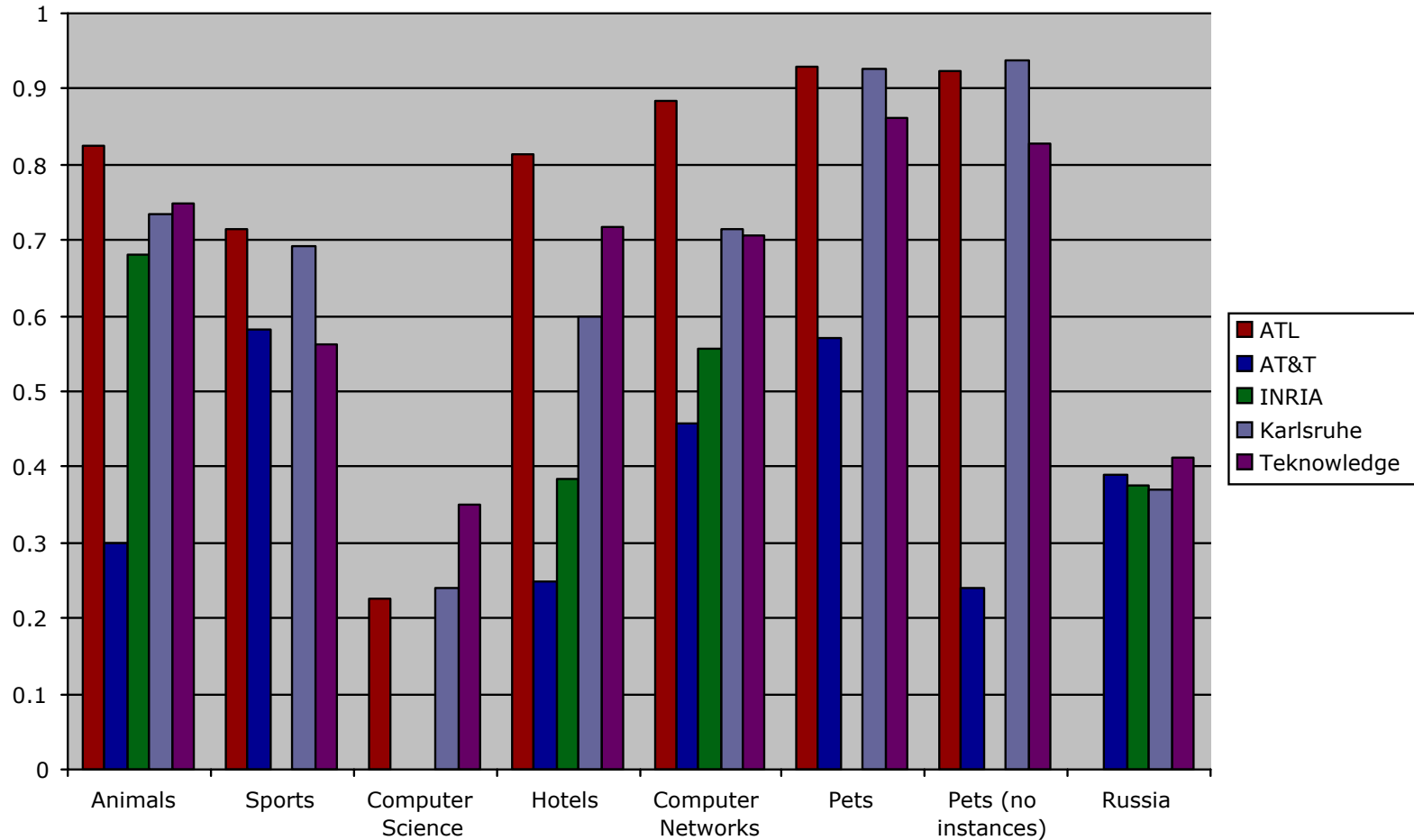
Yun Peng (University of Maryland Baltimore County)

Mike Gruningner (University of Maryland)

I³CON: Experiment Results (1)



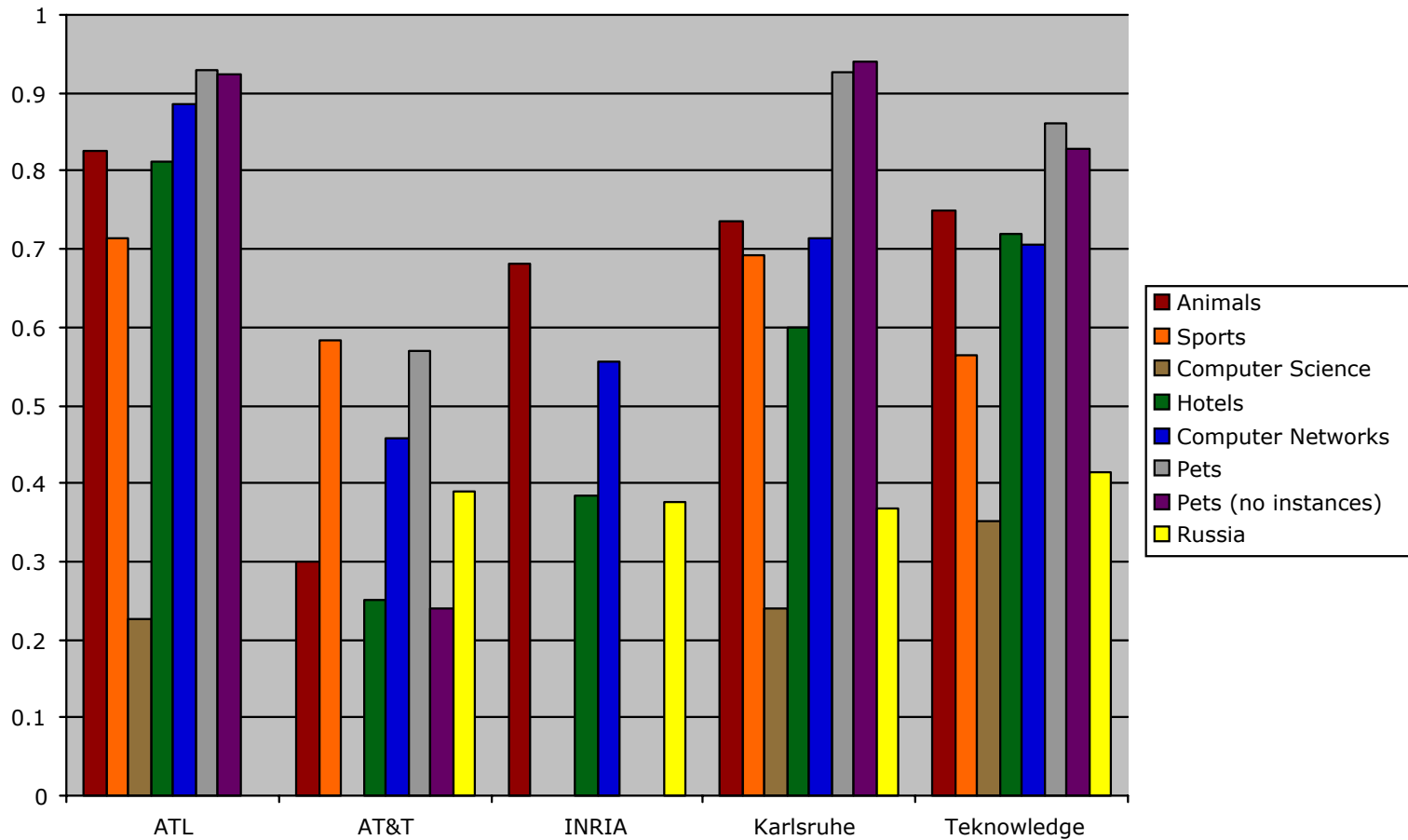
Ontology Pair vs. fMeasure



I³CON: Experiment Results (2)



Organization vs. fMeasure



EON Ontology Alignment Contest



- **Evaluation of Ontology-based Tools 3rd International Workshop**
 - <http://km.aifb.uni-karlsruhe.de/ws/eon2004/>
- **Located at the 3rd International Semantic Web Conference (ISWC 2004)**
 - November 8, 2004
 - Hiroshima, Japan
- **EON Ontology Alignment Contest**
 - Provided participants with a complete test base of ontology pairs
 - Test based on one particular ontology dedicated to a very narrow domain and a number of alternative ontologies of the same domain



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Universität Karlsruhe



EON: Test Ontologies



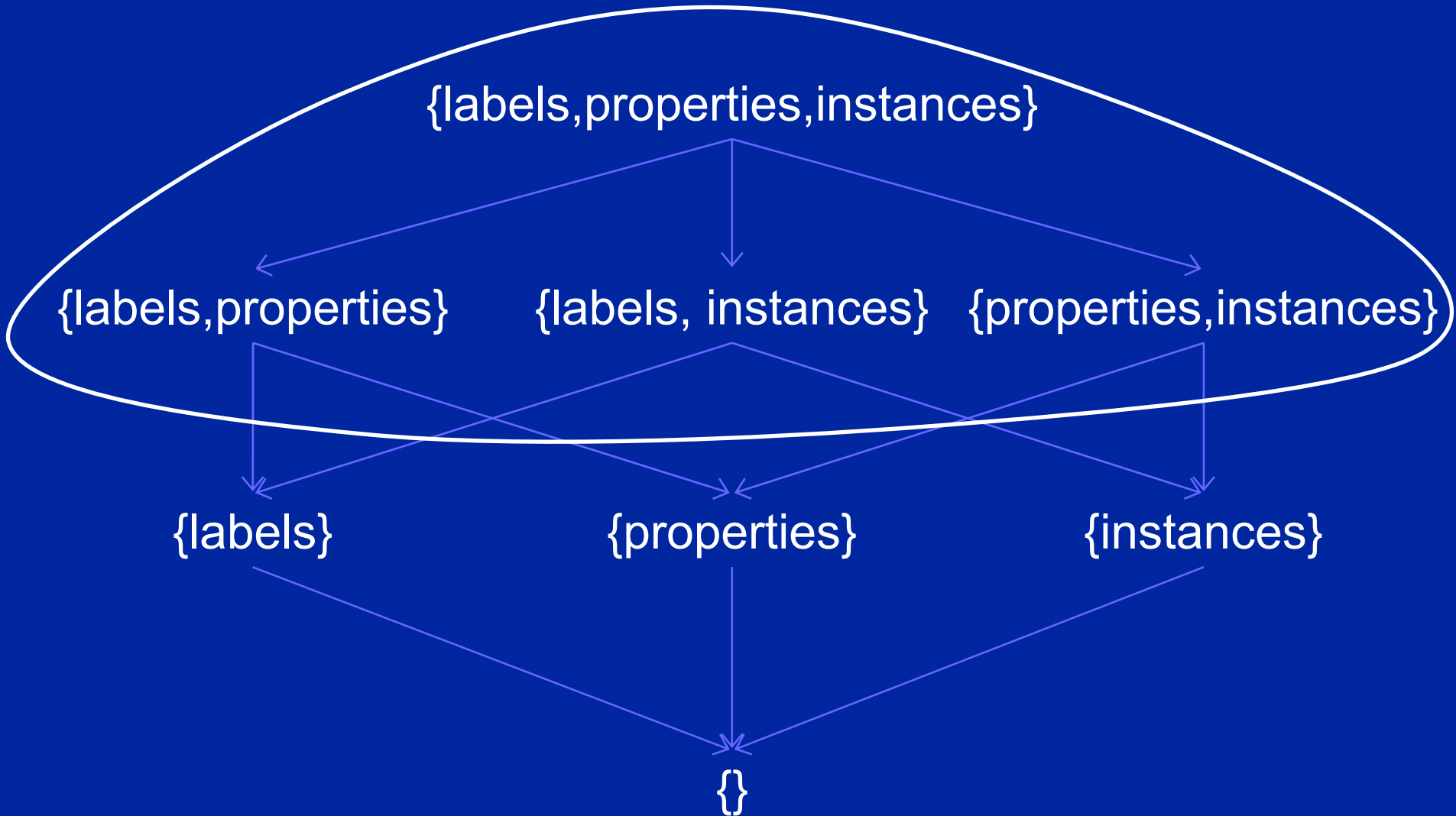
- **1 ontology and 20 variations**
 - 33 concepts, 60 properties, 57 instances
 - Linked with other resources (e.g., FOAF)
 - Expressed in OWL-DL
- **Common domain ontologies ‘in the wild’**
- **Narrow topic: Bibliographic references**
- **Target alignments *published***

EON: Range of Tests

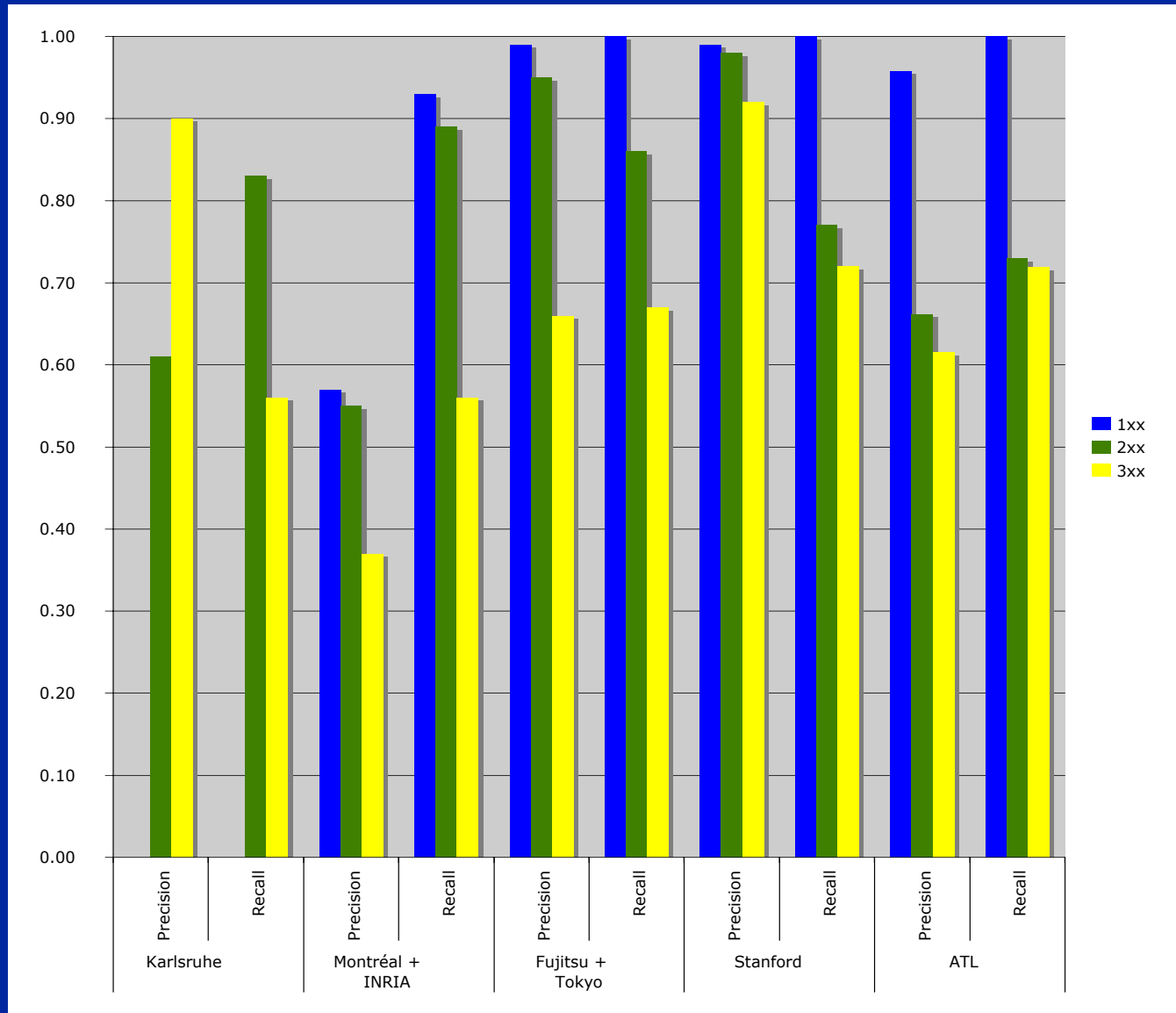


- **1xx: Trivial tests such as aligning the reference ontology with:**
 - Itself
 - Wine ontology of the OWL guide
 - Itself restricted to its OWL-Lite part or its OWL-Lite generalization
- **2xx: Ontologies generated from the reference ontology by altering one feature at a time:**
 - Instances, properties, restrictions, etc.
 - Adding super-classes, collapsing the hierarchy, etc.
- **3xx: Ontologies on the same topic found on the web (UMBC, MIT, Karlsruhe, INRIA) without change**

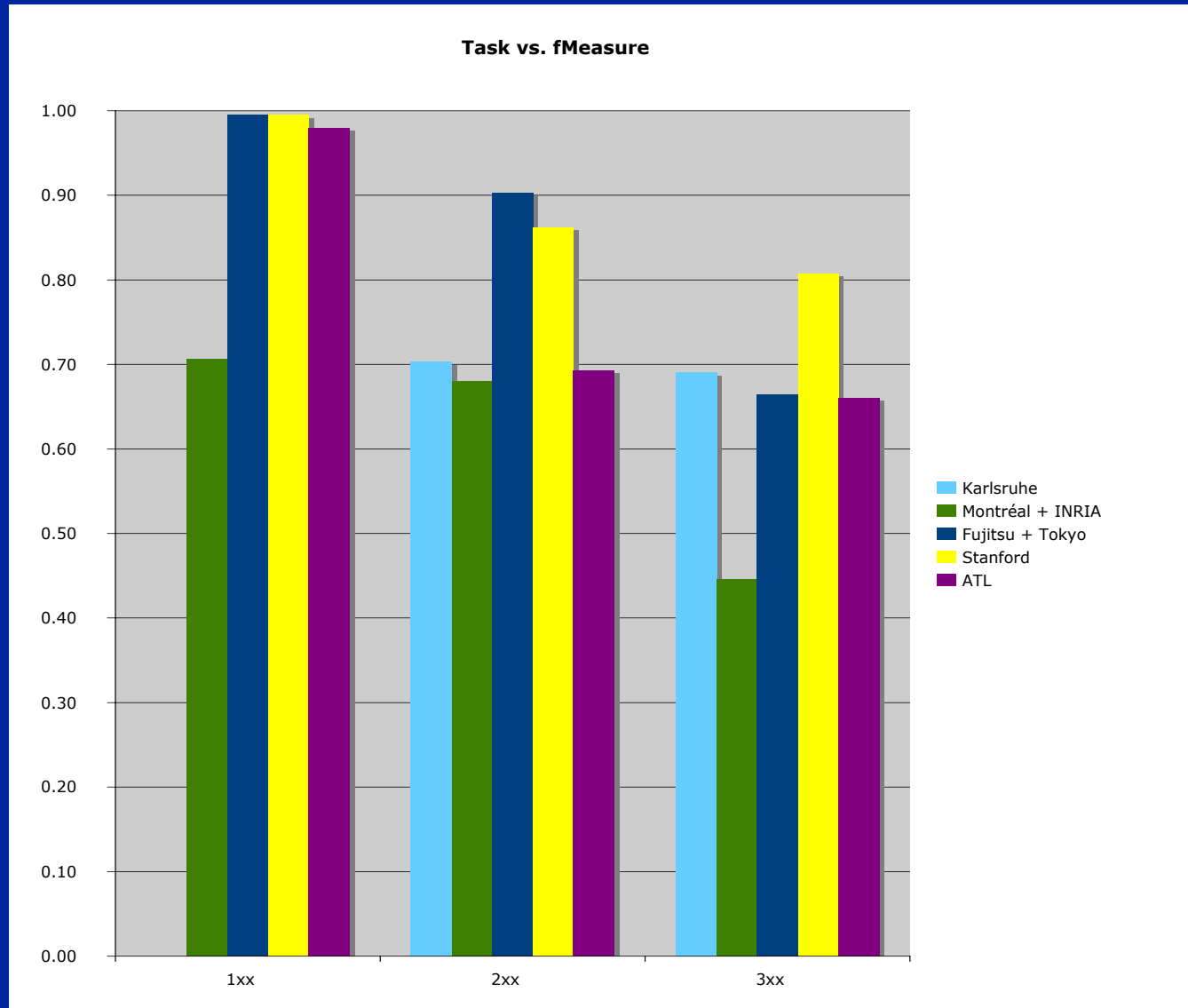
EON: Range of Tests



EON: Contest Results (1)



EON: Contest Results (2)



Some Lessons Learned



- **No single technical approach performed best on *all* test ontology pairs**
- **No single ontology pair was best for *all* technical approaches**
- **All approaches performed >0.5 fMeasure on at least one ontology pair**
- **All approaches performed <0.5 fMeasure on at least one ontology pair**
- **No silver bullet!**

Ontology Alignment Evaluation

Future Efforts



- **Combine both Lockheed Martin and INRIA initiatives to form a stable annual contest/experiment**
- **Tests:**
 - **Benchmark Ontology Suite**
 - **More ontology pairs with controlled variation**
 - **Grand challenge**
 - **Demonstrate the efficacy of ontology alignment ‘middleware’**
- **Provide more automated procedure and platform for participants**
- **Build Organizing Committee**
- **Find sponsorship**



Information Interpretation and Integration Conference

<http://www.atl.lmco.com/projects/ontology/I3CON>

EON Ontology Alignment Contest

<http://co4.inrialpes.fr/align/Contest>

