Ontology alignment metadata
Opinion and experiments

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What is an alignment?

- A set of correspondences $\langle e, r, e' \rangle$ between entities of two ontologies (o and o');

- Entities may have various complexity (named classes, descriptions, queries, etc.);

- There may be different relations (equivalence, subsumption, disjointness, disjunction of such, etc.);

- Additional metadata may be applied.

Jérôme Euzenat, Pavel Shvaiko, Ontology matching, Springer, 2007
`http://book.ontologymatching.org`
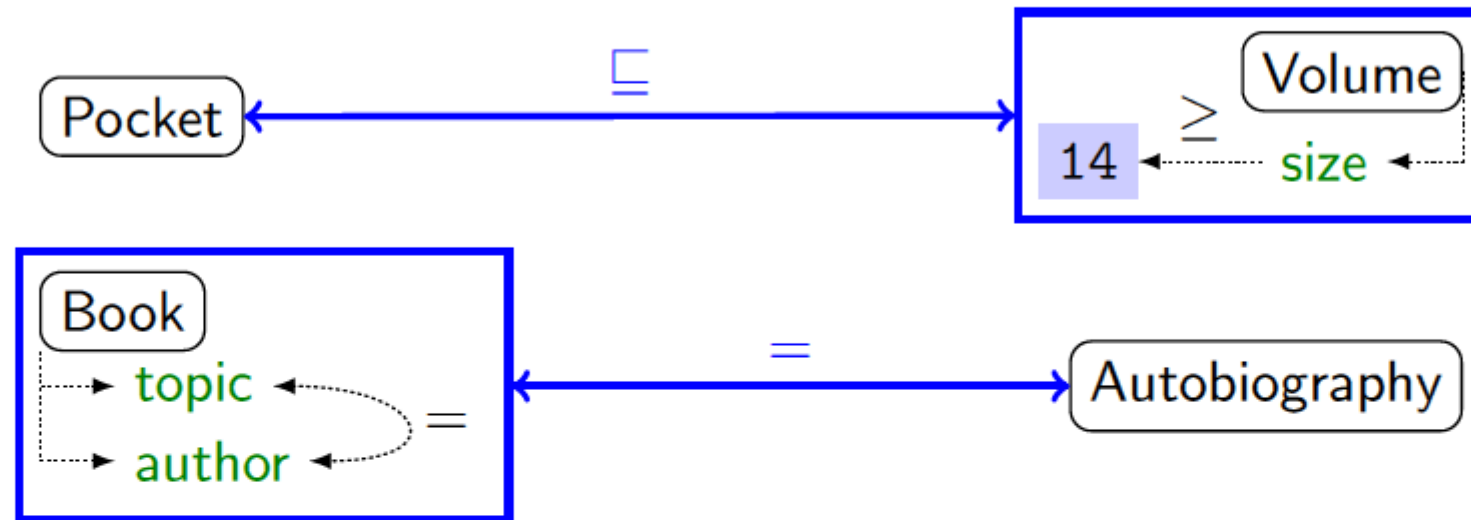
Ontology alignment
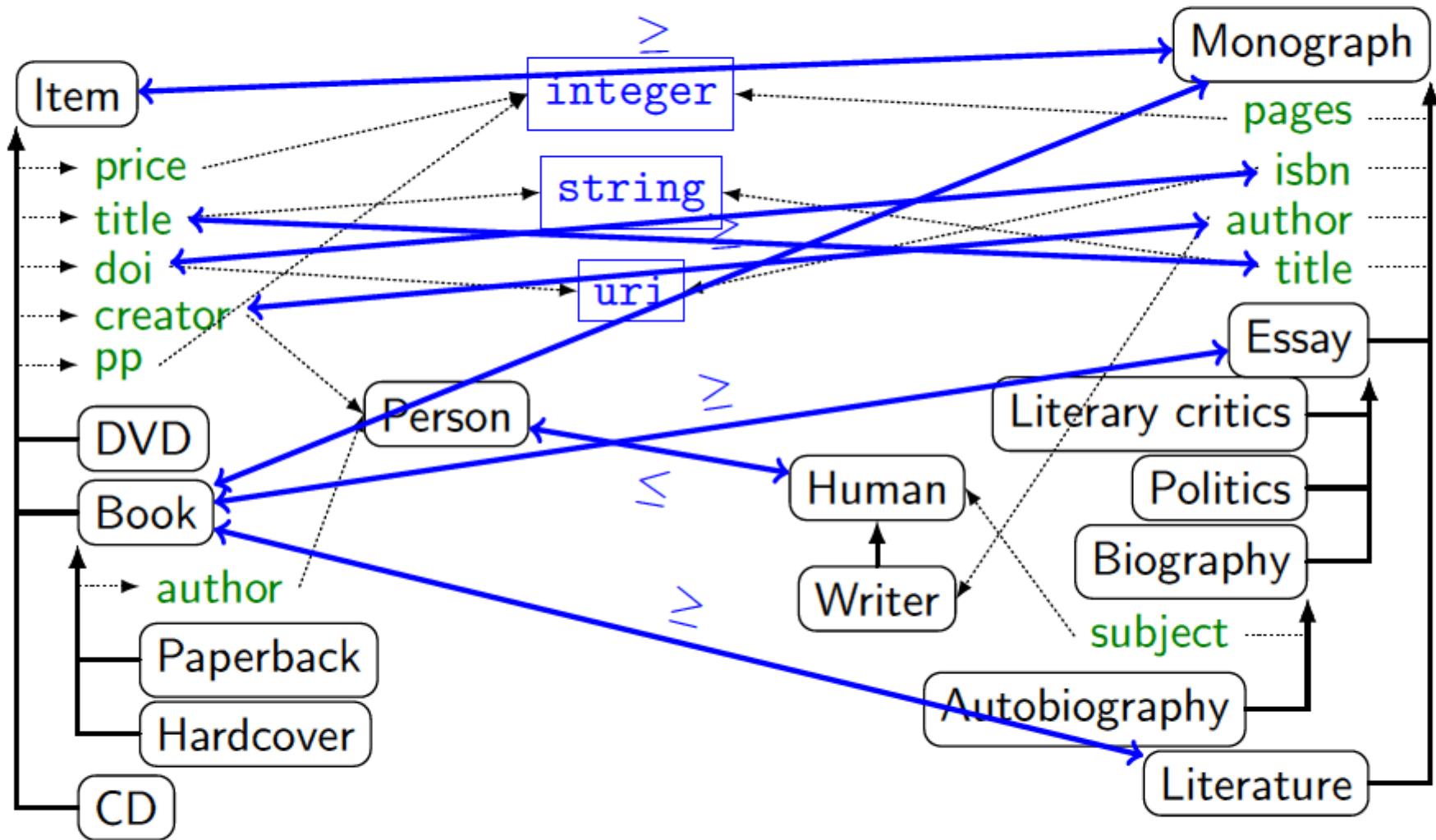
Alignments as first class citizens

It is important to have alignments as independently manageable entities:

- ▶ correctness and completeness: alignments may be in various degrees of achievement (competing methods, ongoing work, they may be combined);

- ▶ expressiveness: alignments may be expressed in languages of various expressiveness (see EDOAL);

- ▶ a correspondence alone may not be inconsistent, several of them may.

`http://alignapi.gforge.inria.fr`

Expressive alignments (EDOAL)

$$\forall x, Pocket(x) \Leftarrow Volume(x) \wedge \exists y, size(x, y) \wedge y \leq 14$$
$$\forall x, Book(x) \wedge \exists y, author(x, y) \wedge topic(x, y) \equiv Autobiography(x)$$

Alignments are not ontologies

They may be used for many different purposes:

- ▶ Ontology merging;
- ▶ Query transformation;
- ▶ Ontology translation;
- ▶ Instance import;
- ▶ Data interlinking.

Alignments are not only ontology metadata

For the NeOn project, we experimented with OMV (Open Metadata Vocabulary) which tends to express metadata schemata as ontologies. Hence, alignments simply become ontology metadata.

But Alignment metadata is very important:

- ▶ to retrieve alignments;
- ▶ to qualify alignments.

Alignment server

http://aserv.inrialpes.fr
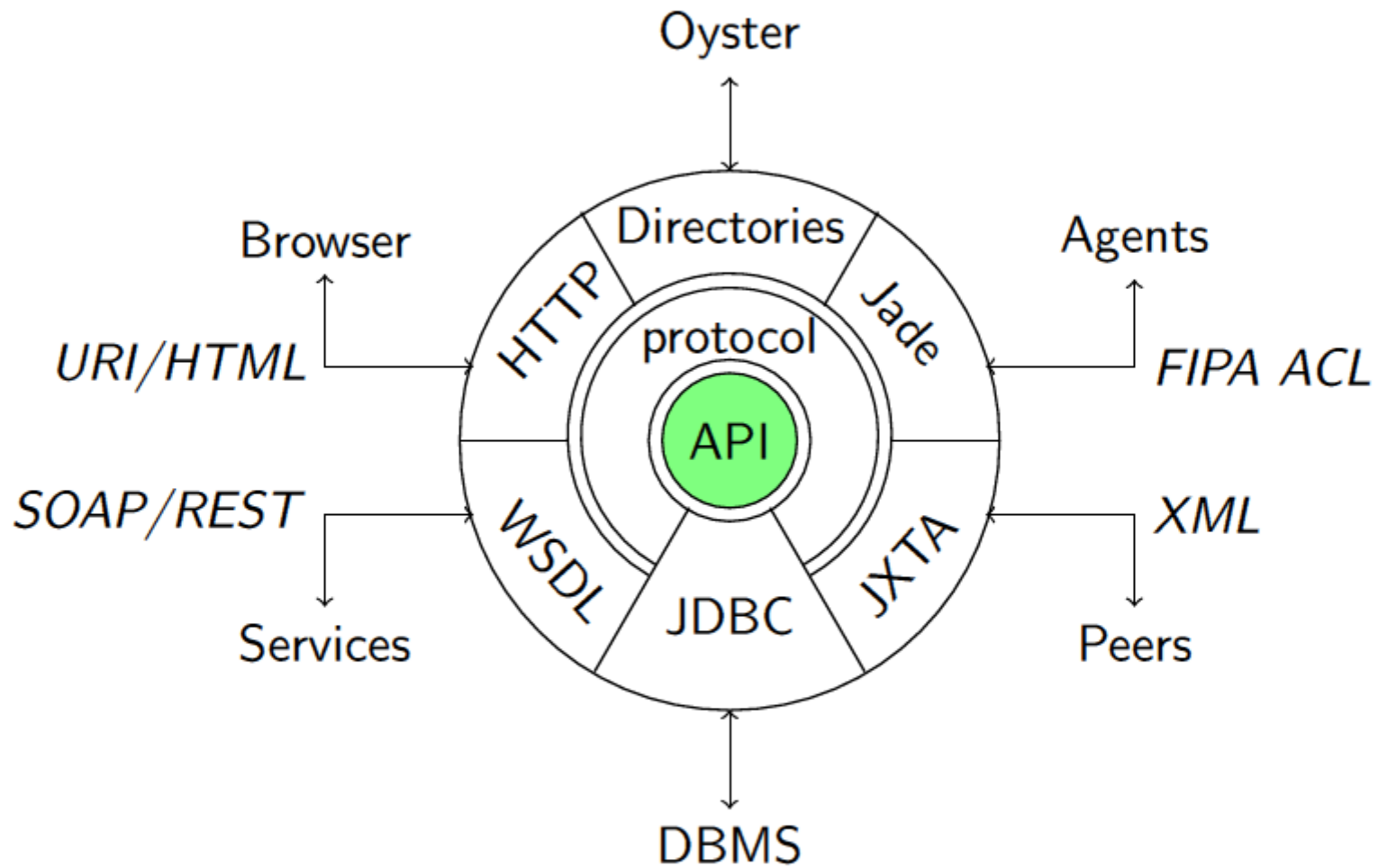
Alignment format

A format for expressing alignments that promotes extensibility:

▶ RDF/XML, XML, may contain various kinds of entities:

▶ Alignment level metadata:

▶ Correspondence level metadata;

▶ Metadata preserved across all operations and stored in the server.

Description metadata

- Identifier;

- Matched ontologies;

- Alignment type (arity, language);

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Provenance metadata

- ▶ Agent and date of alignment generation;

- ▶ Method used for generating the alignment;

- ▶ Process obtained for generating the alignment;

- ▶ Resources used for matching;

- ▶ Purpose of the alignment.

Quality metadata

- ▶ Measures computed on the alignment: precision, recall, coherence;
- ▶ Formal properties of alignments: consistency, coverage, coherence;
- ▶ Judgement on alignment quality;
- ▶ Arguments in favour or against a correspondence;
- ▶ Confidence on correspondences.

Conclusion

- Alignments should be stored on par with ontologies;
- Alignment metadata is indeed very important for retrieving and qualifying them;
- There are experiments (Bioportal, Cupboard, The Alignment server);
- No metadata schema may be frozen before use, so an extensible framework is appropriate.

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http://exmo.inrialpes.fr