

Search Ontology, a new approach towards Semantic Search

*Alexandr Uciteli, Christoph Goller, Patryk Burek, Sebastian Siemoleit, Breno Faria,
Halyna Galanzina, Timo Weiland, Doreen Drechsler-Hake, Wolfram Bartussek, Heinrich Herre*
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Use Case:

Post-Market Surveillance (PMS) of Medical Devices

▶ OntoVigilance Project

- ▶ Each manufacturer is obliged to set up a system of PMS.
- ▶ The primary purpose is protection of the patients safety and development of safer medical devices for public health.
- ▶ The retrieval of suitable information for a rule-consistent PMS is hampered by highly heterogeneous data sources and a whole amount of data sets to be evaluated.
- ▶ *project aims:*
 - ▶ development of an ontology for the post-market surveillance and vigilance domain (PVO)
 - ▶ development of an ontology-based tool which supports a systematic gathering of clinical safety data of medical devices

▶ Partners

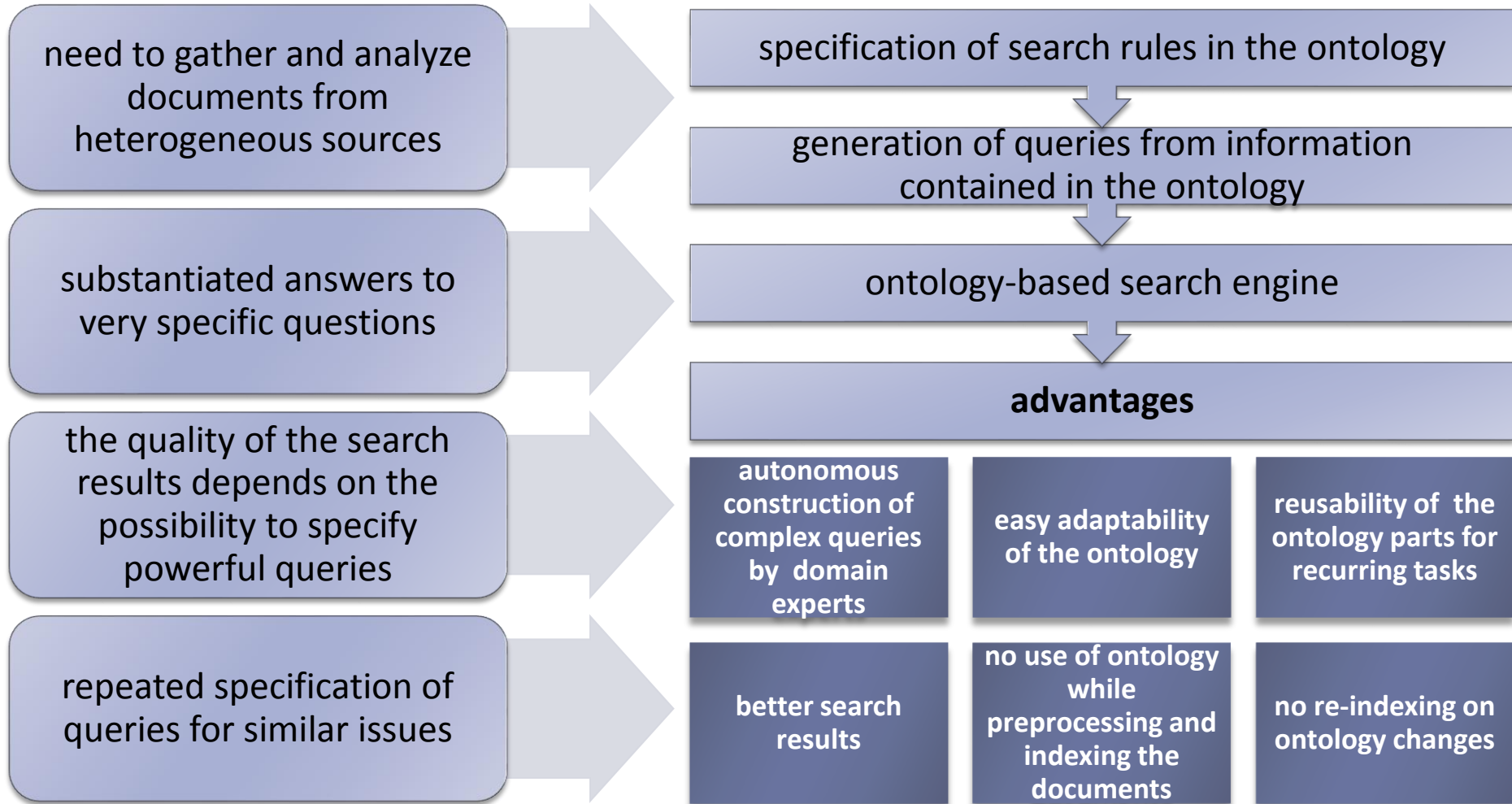
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Motivation



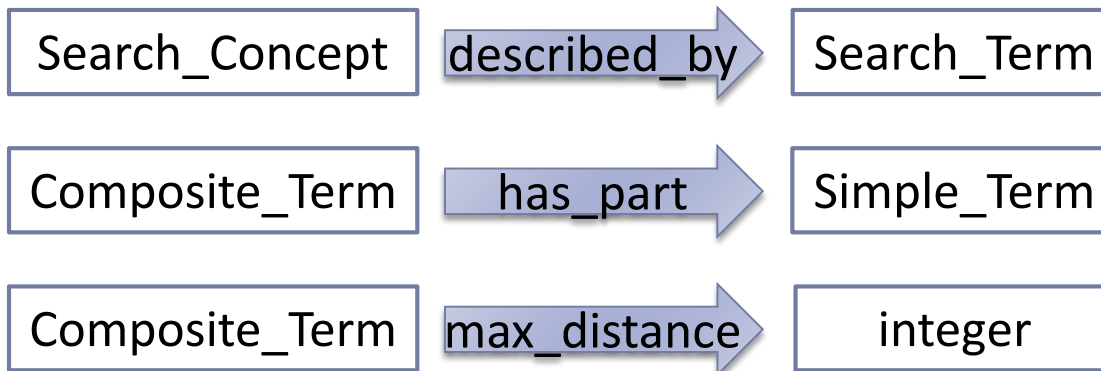
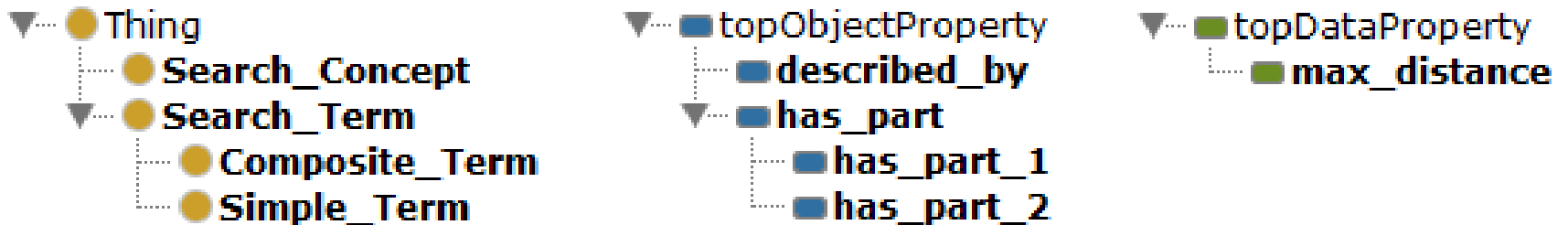
Ontological Architecture

General Formal Ontology (GFO)

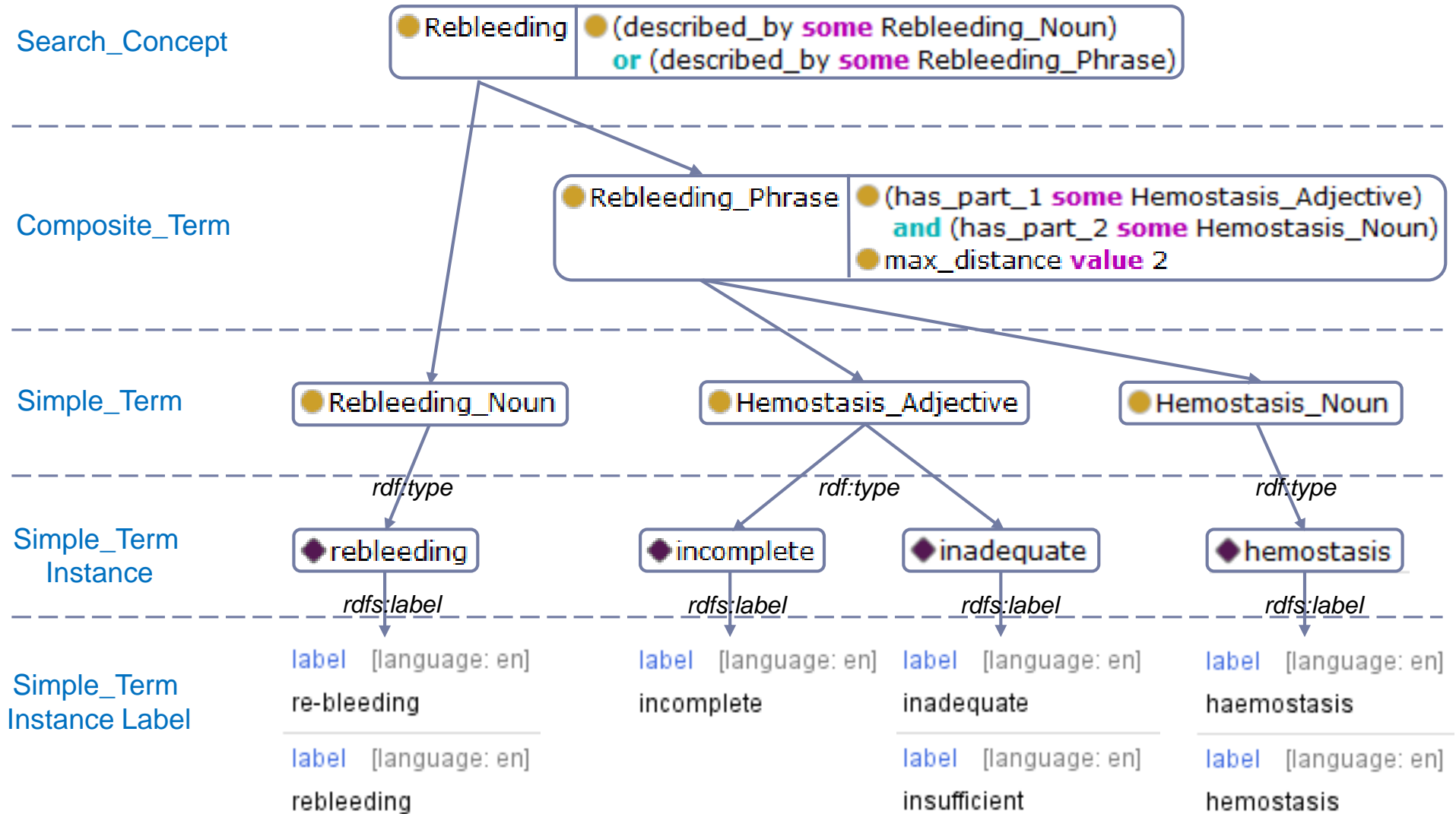
Search Ontology (SO)

Domain Search Ontology (DSO)

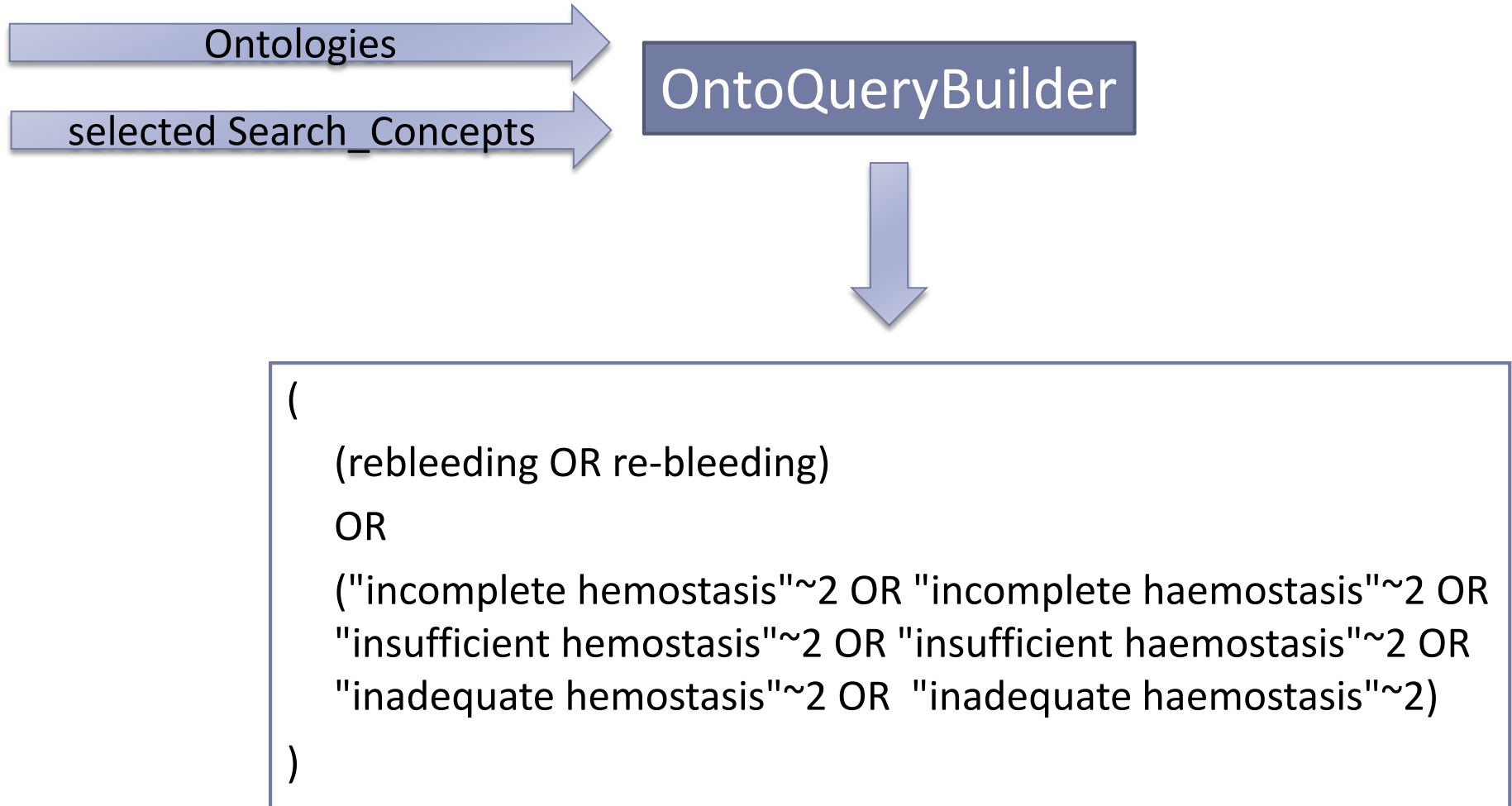
Search Ontology



Example: Domain Search Ontology (PVO)



OntoQueryBuilder (OQB): Generating of Queries



Improvements on the Search Side

- ▶ Morphological Analyzers can improve Recall & Precision and simplify SO specification.
 - ▶ heart attach -> heart attacks
 - ▶ hemostasis -> haemostasis
- ▶ Use information extraction technology (entity extraction, dependency parsing) to extract SO-independent entities and general relations from text, and store them in the fulltext index to allow more powerful queries and search concepts, e.g.:
 - ▶ search for arbitrary persons near the search terms “Microsoft” and “founding”

 Microsoft.

....sein Betriebssystem Windows und seine Büro-Software Office. Das Unternehmen wurde 1975 von Bill Gates und Paul Allen gegründet. Der Name Microsoft steht für Microcomputer-Software, ursprünglich...

- ▶ search for a relation with search term “cause” containing a specific product (search term) and problem (e.g. rebleeding) or for all relations with search term “cause” and the product.
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Conclusion

- ▶ Search Ontology
 - ▶ modular design
 - ▶ relatively simple structure
 - ▶ is applicable by non-ontologist domain experts without excessive efforts and deeper knowledge of the query syntax
- ▶ specifying and re-using complex search queries
- ▶ no re-indexing the document collection on ontology changes

Thank you for your attention!
