Project StahlDigital - lessons learned

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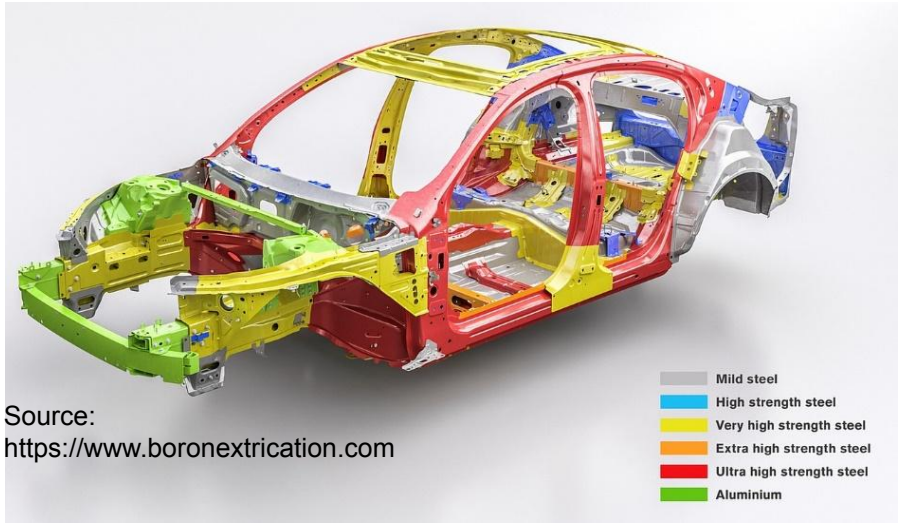
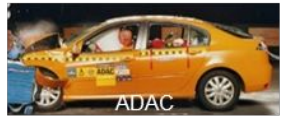
- Part of Plattform MaterialDigital
  - Different materials, e.g. steel, copper, rubber, glass, concrete …
  - Different problems, e.g. simulation workflows, digital twin, ML, …
  - All using ontologies and tackle material science challenges
- Partners: MPIE, Fraunhofer IWM, InfAI
- BMBF funded 2021-2024.
- Main Topics Project StahlDigital
  - ontology development workflow
  - development of domain specific ontology
  - Ontology based workflows



Source:
https://www.boronextrication.com



Warmwalzen → Kaltwalzen → Wärmebehandlung → Bauteilherstellung → Bauteileinsatz: Crash

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xlsx2owl
Easy and collaborative interface

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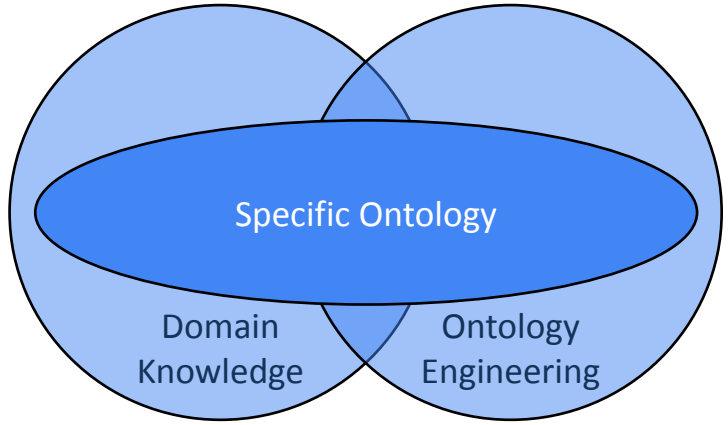
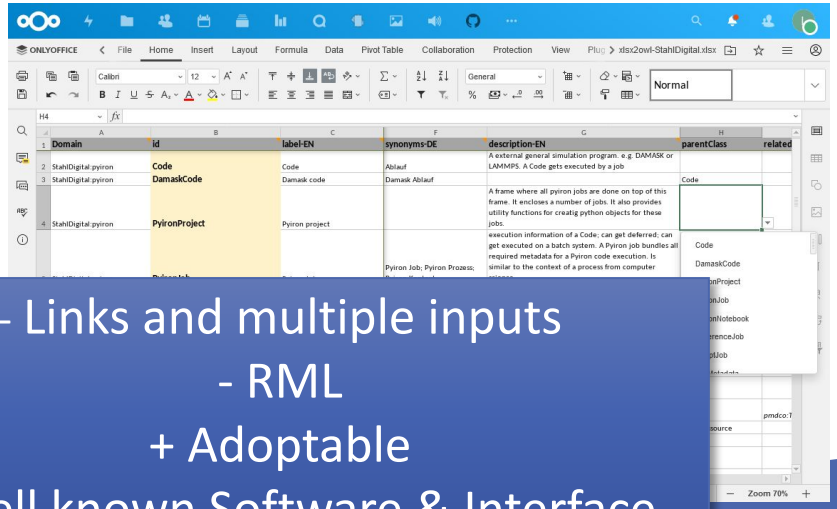
Goal: Easy & collaborative Interface

- Spreadsheet Interface
  - For: classes, properties, attributes, individuals, metadata, …
  - Support for references
  - Collaborative editing via cloud hosting
- Conversion script using
  - YARRRML / RML mappings
  - Functions via FNO
- Additional sheet strucure for concepts
- OpenSource at https://github.com/AKSW/xlsx2owl
- Special Thanks to eccenca GmbH for initial idea and input https://eccenca.com





- Links and multiple inputs
- RML
+ Adoptable
+ Well known Software & Interface

CI pipeline with nextflow

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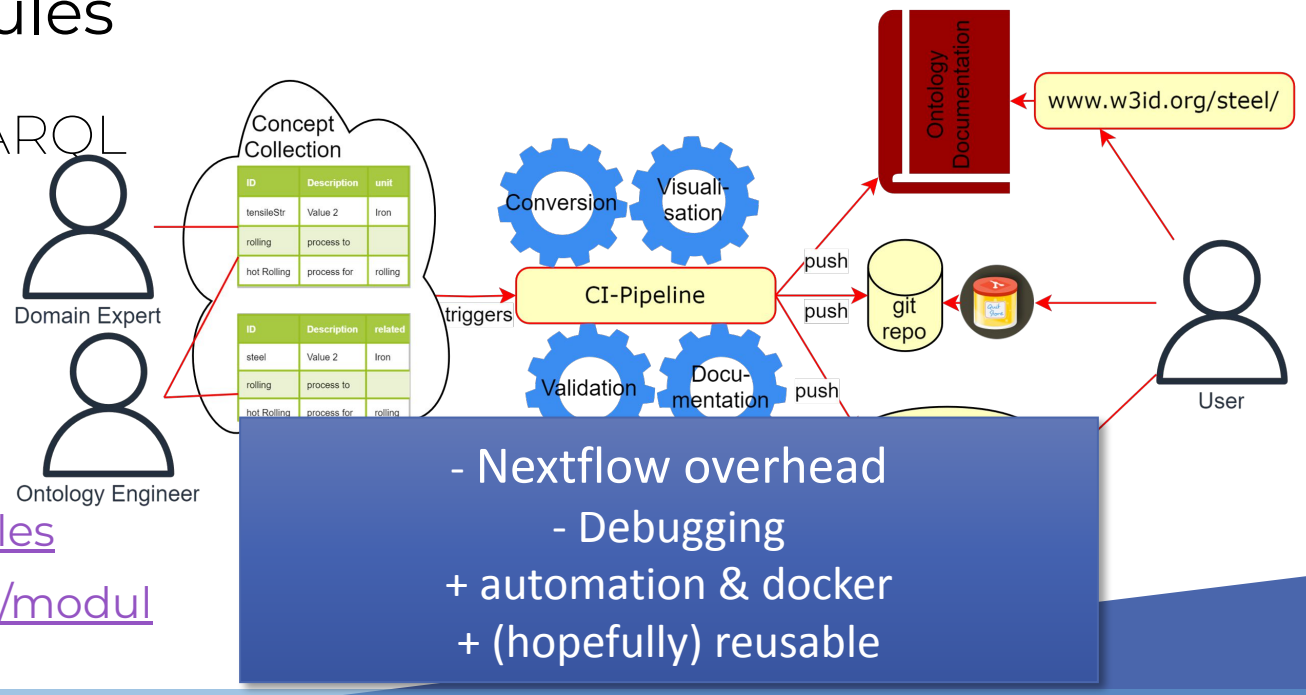
Goal: automate the work

- Automated CI pipeline from spreadsheets to RDF + …
- Realized with nextflow modules
  - Xlsx2owl
  - RDF handling, e.g. merge, SPAROL update queries
  - Shacl shapes
  - Documentation with JekyllRDF + JOD
  - Git upload
  - DSMS upload
- https://github.com/AKSW/ontoflow-modules

  https://gitlab.com/infai/semantic-nextflow/modules



Persisting Vocabulary

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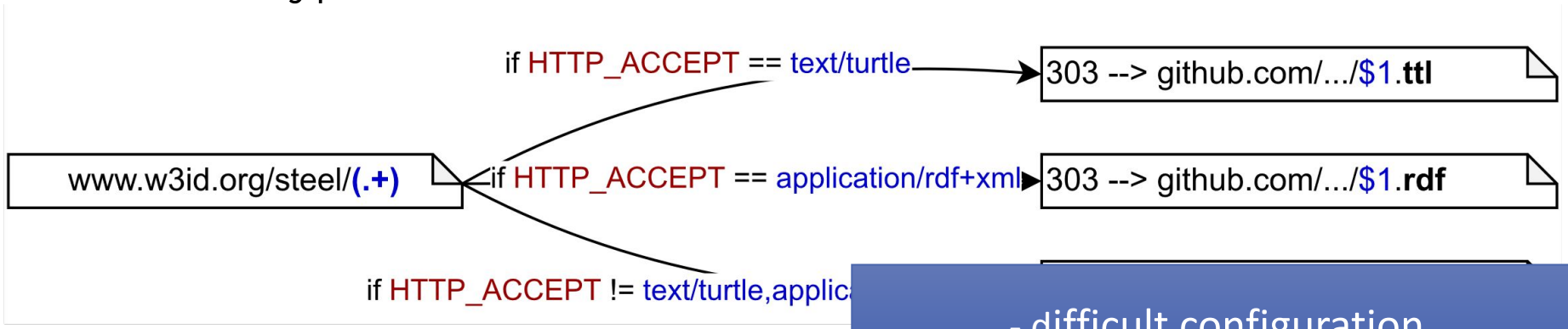
Goal: make vocabulary accessible

- https://w3id.org/steel/ProcessOntology
- GitHub Pages as persistent storage
- W3id for persistent namespace
- W3id for content type based redirection

~~Error 404~~

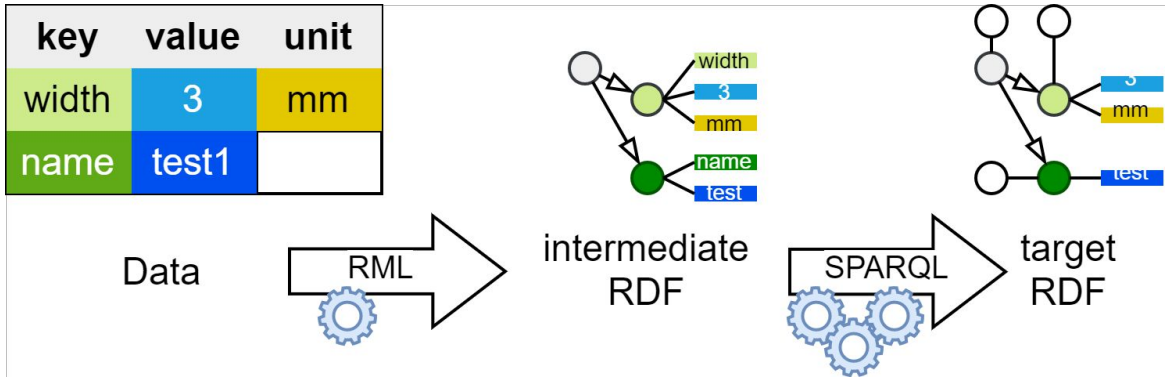


- Configuration is error prone W3id-tester https://github.com/AKSW/w3id-tester

- difficult configuration
+ low maintenance
+ (hopefully) longterm

Experiment 1: Mapping prototype based on Field names

- Info from vocabulary + field name info



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Experiment 2: filtering Emmo for StahlDigital with ChatGPT

- 180 StahlDigital concepts topics
- Topics + ~ 800 Emmo Class Names --> 55 Emmo Class Names
- Problems: Context Size

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Experiment 3: Description fixing with ChatGPT

- Idea: Enrich Tables text fields: Table Table+
- Difficult

😐

Thank you

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Summary

- Tables as input
  https://github.com/AKSW/xlsx2owl
- CI pipeline
  https://github.com/AKSW/ontoflow-modules
  https://gitlab.com/infai/semantic-nextflow/modules
- w3id + github pages
  https://github.com/AKSW/w3id-tester
- https://w3id.org/steel/ProcessOntology

Presented work is team effort of StahlDigital team, especially:

- Kirill Bulert
- Norman Radtke

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