

# Bridging Repositories, ELNs and Semantic Data Management: A LinkAhead-based use case for 3D Additive Manufacturing

Florian Spreckelsen<sup>1</sup>, Alexander Schlemmer<sup>1</sup>, Frank Tristram<sup>2</sup>, Henrik tom Wörden<sup>1</sup>

<sup>1</sup>IndiScale GmbH (www.indiscale.com)    <sup>2</sup>Karlsruhe Institute of Technology    [f.spreckelsen@indiscale.com](mailto:f.spreckelsen@indiscale.com)

Managing (meta-)data across interdisciplinary collaborations [...] involves multiple tools, making accessibility and synchronization [...] challenging. We developed a solution based on LinkAhead that integrates meta data from different repositories and ELN systems into a single RDMS. [...] APIs enable (semi-)automatic workflows, e.g.:

1. A researcher enters meta data in an ELN
2. These are imported into LinkAhead by the crawler
3. They can be sent directly to a repository for publication

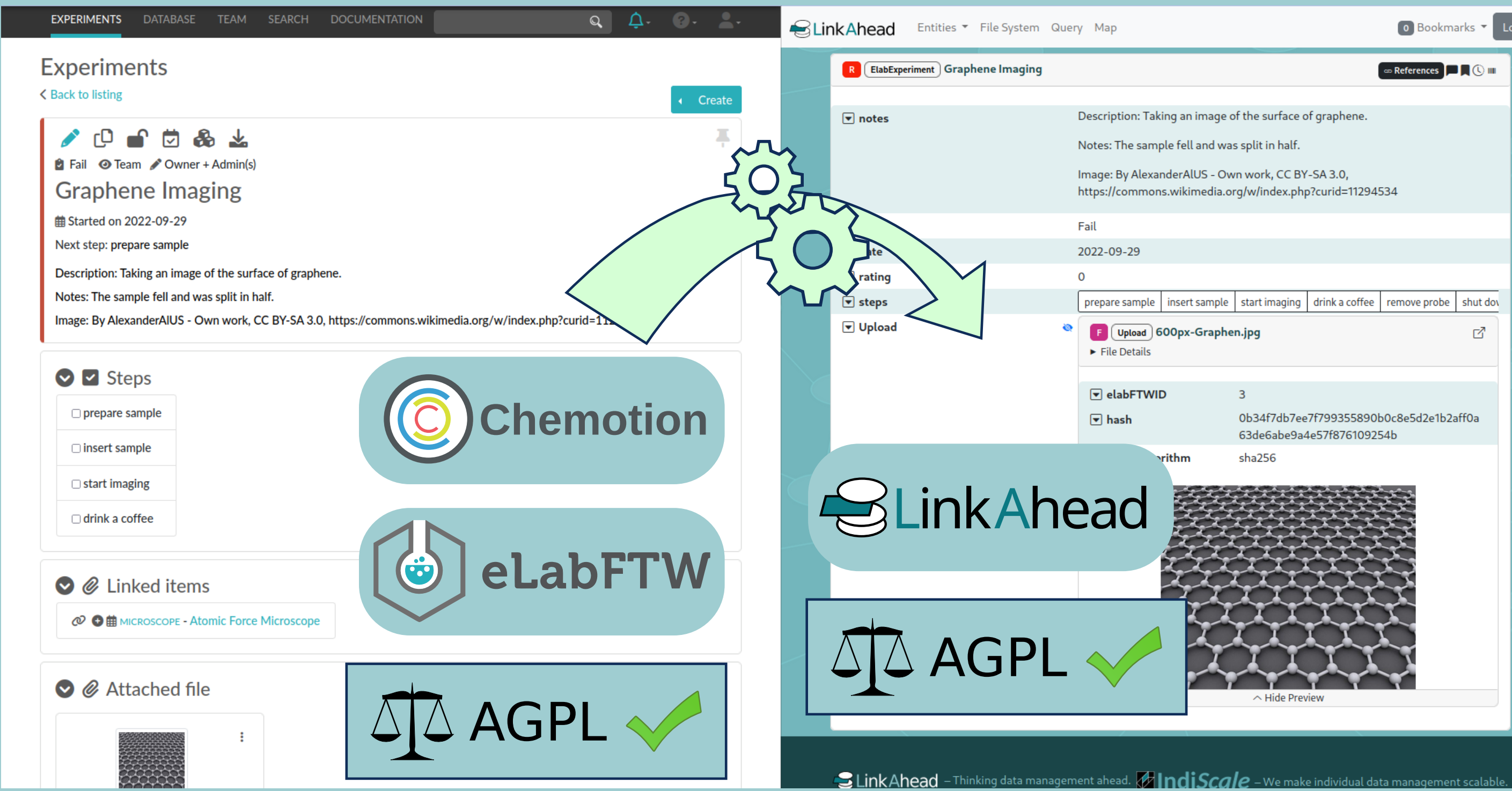
The RDMS is extensible [...] and provides a web interface and API for intuitive searching and re-use of meta data.



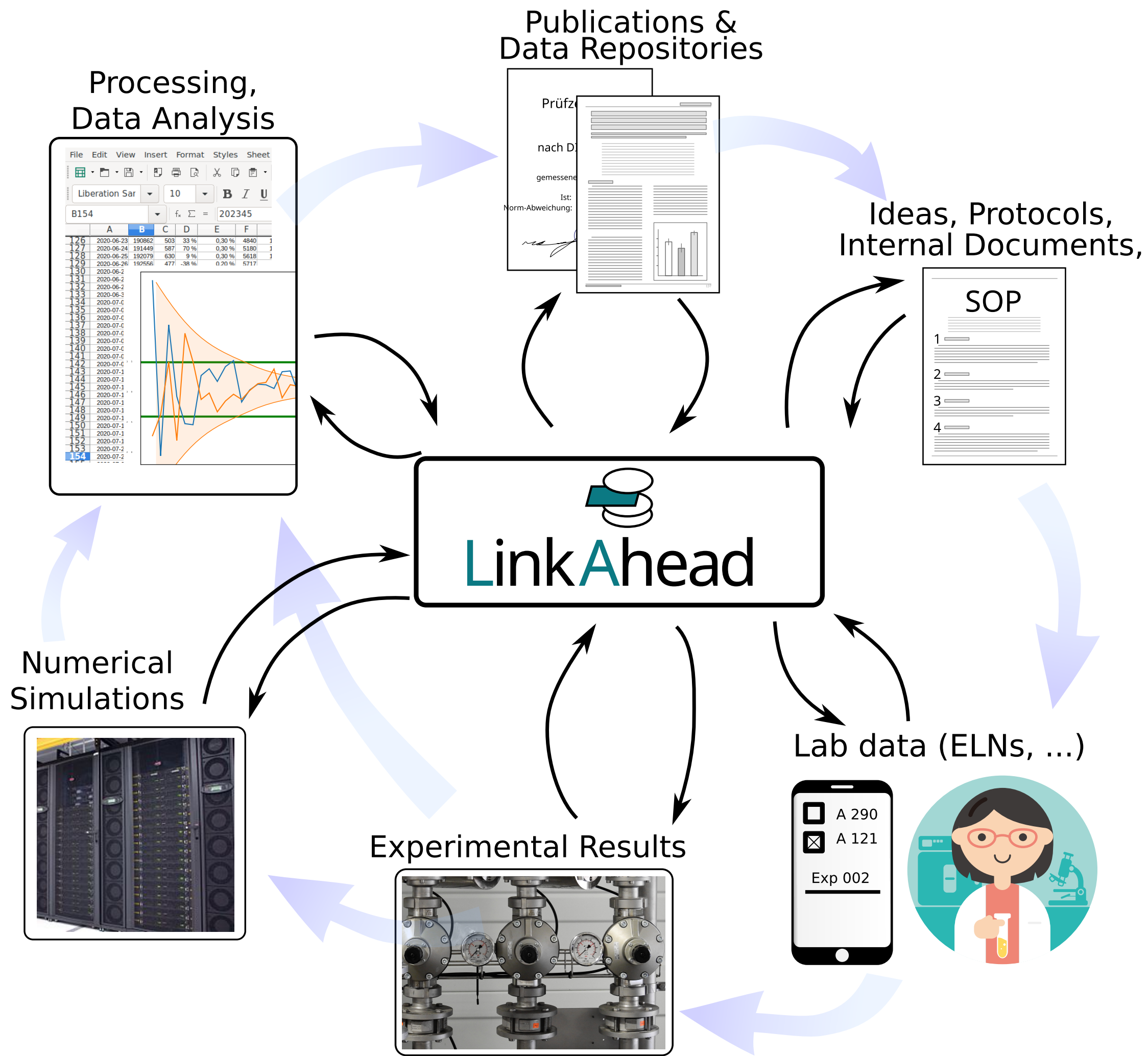
Full Abstract

## ELN integration: key to user acceptance

**ELNs (Electronic lab notebooks):** device and experimental settings, semi-structured **Data:** Critical for filtering and analysis  
**Approach:** Automatic integration of ELN data into data management system

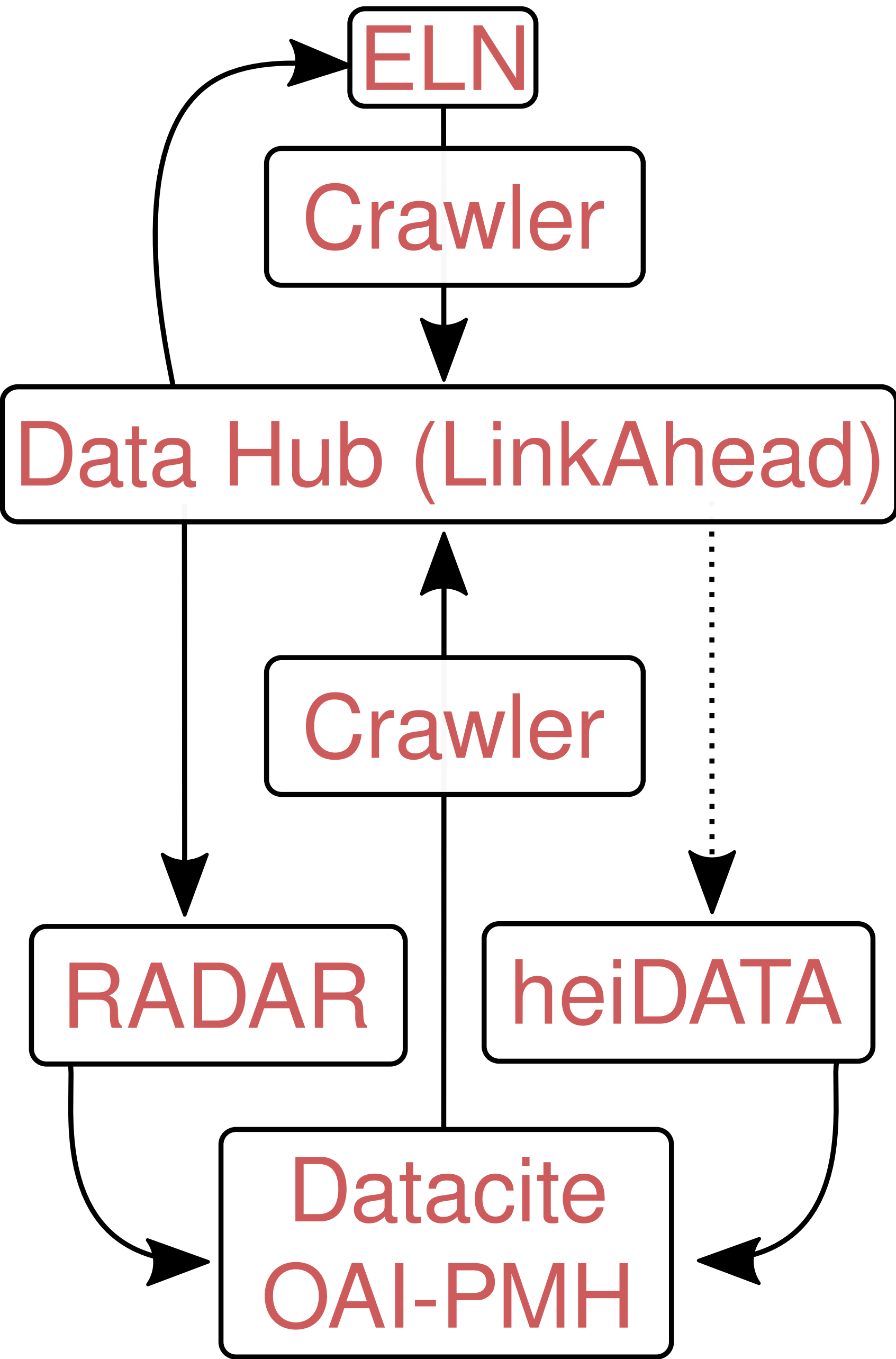


**Data lifecycle**  
**Valuable data** = Interoperable, reusable data. LinkAhead **integrates** data from all lifecycle stages and connects the data sets via **semantic links**.



**LinkAhead's data model**

- Inheritance structure of RecordTypes.
- Records (= data) may choose to have additional Properties.
- Graded importance system for Properties.



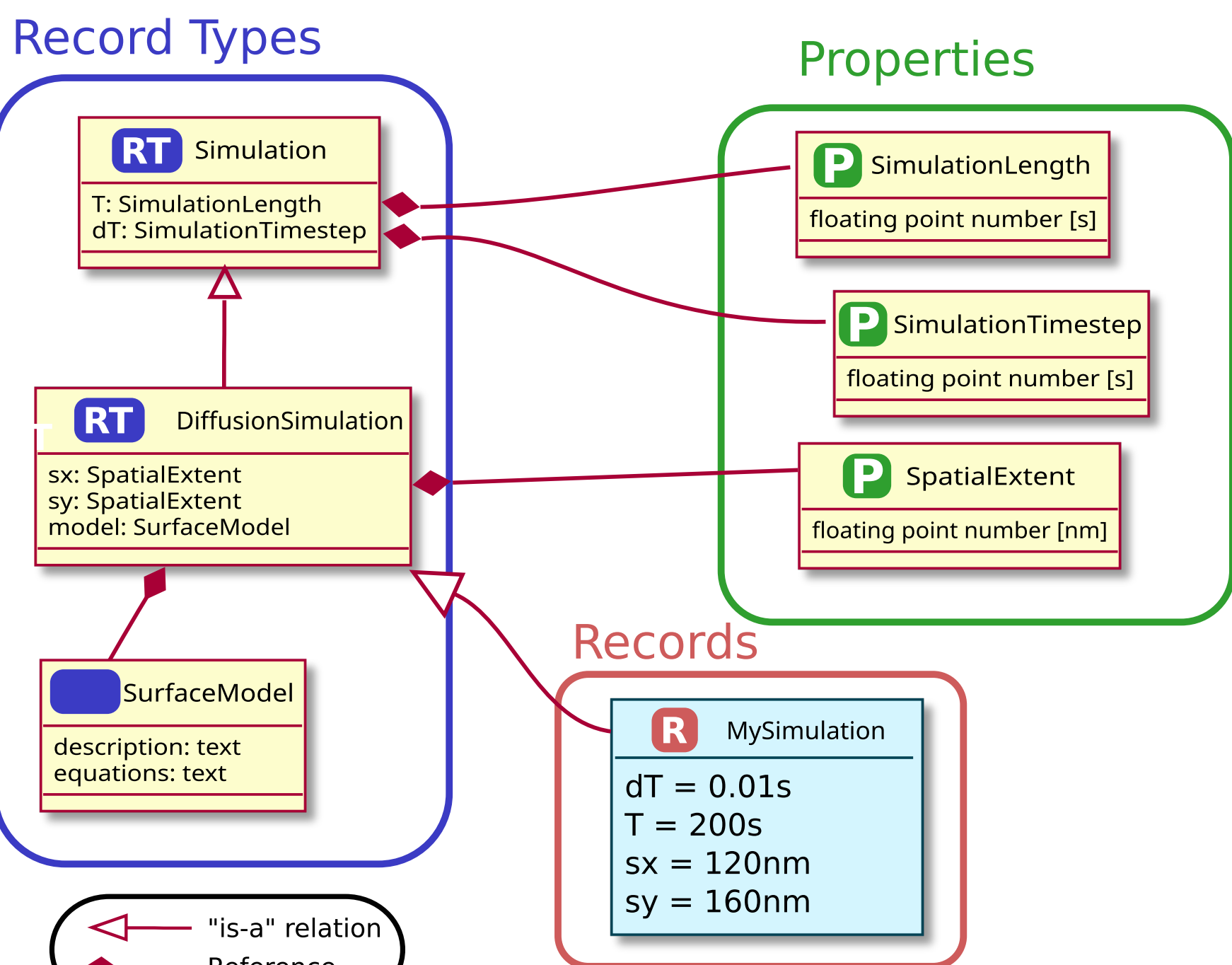
**Publications**

1. CaosDB — Research Data Management ..., Fitschen et al., Data, 2019
2. Guidelines for a Standardized ..., Spreckelsen et al., Data, 2020
3. Mapping Hierarchical File Structures ..., tom Wörden et al., Data, 2024

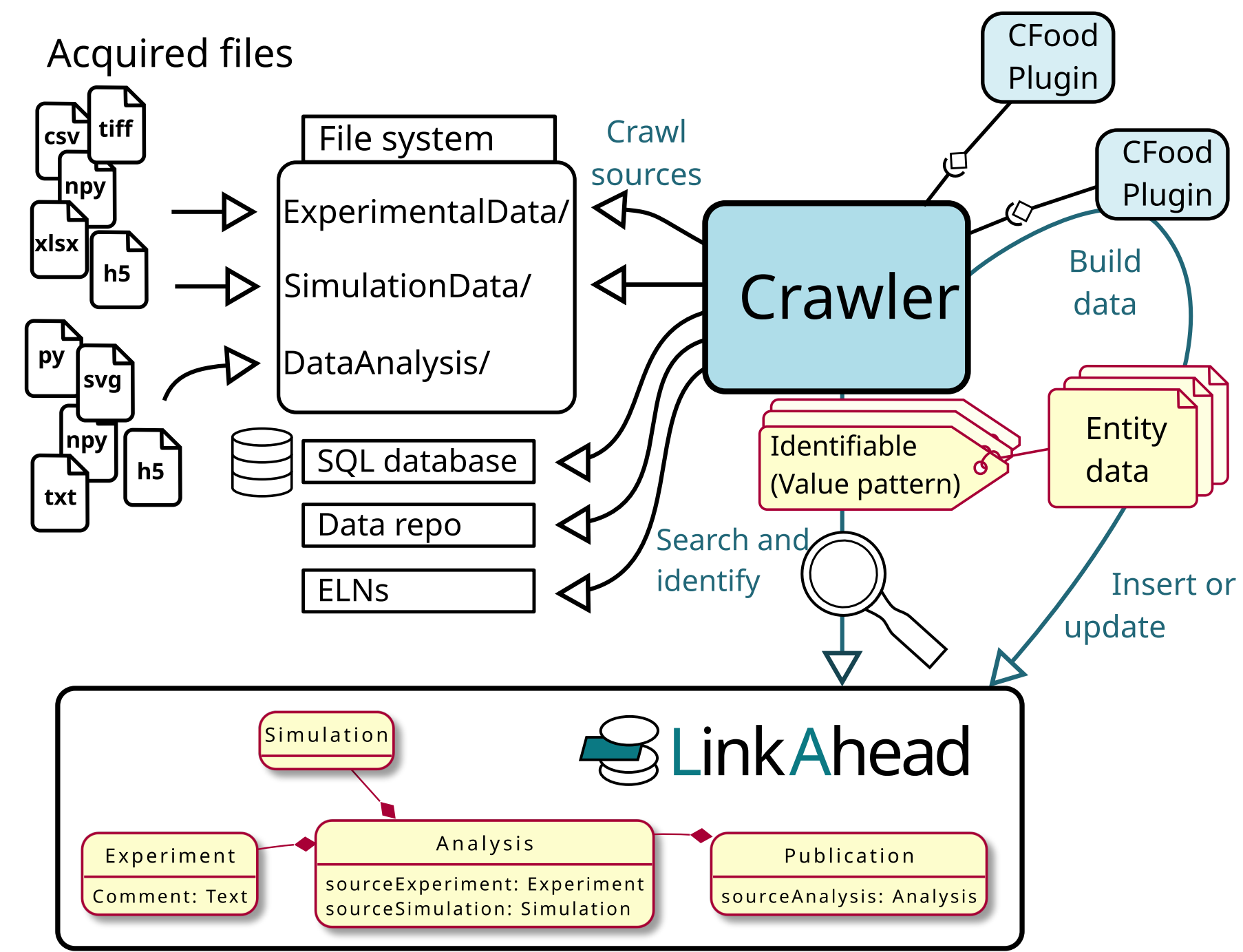
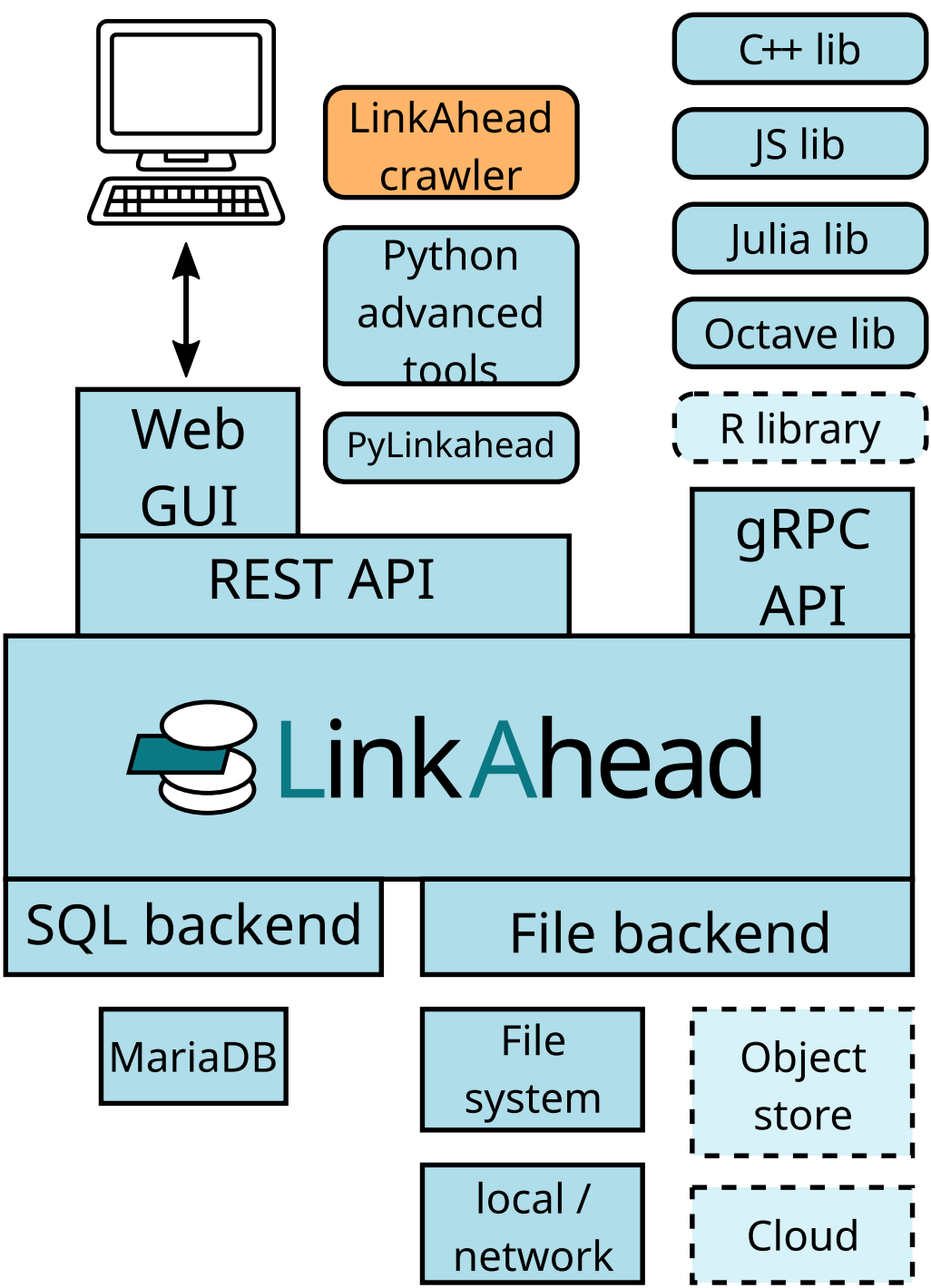
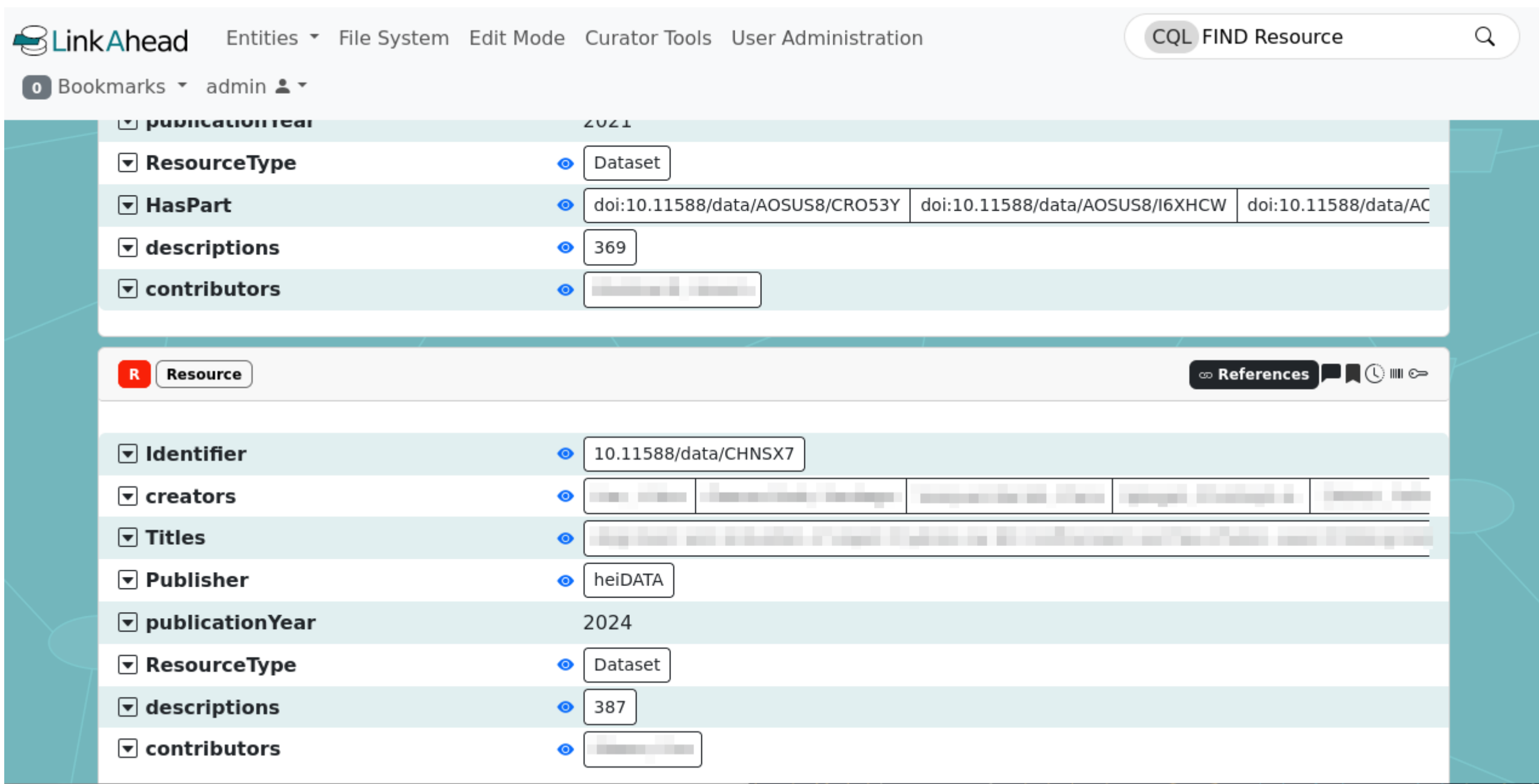
tom Wörden, 2024

Fitschen 2019

Spreckelsen 2020



**Automated data crawler**  
Framework for **automated data integration**:  
- Find new or changed raw data.  
- Simplifies integration with **existing systems**.  
- Based on Python library.



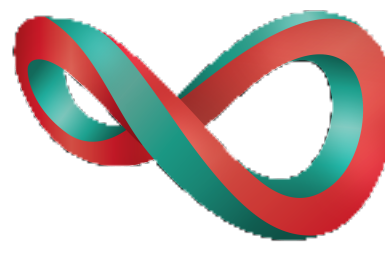
**LinkAhead is Open-Source!**  
License: AGPLv3, <https://gitlab.com/linkahead>  
Code review by IndiScale GmbH, which also provides services for LinkAhead.

Sourcecode on gitlab.com

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IndiScale GmbH • Lotzestraße 22a • 37083 Göttingen  
Geschäftsführung: Henrik tom Wörden  
Registergericht: AG Göttingen • HRB 205721



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