

# BEYOND THE RENDER SILO

## Semantically annotating 3D data within an integrated knowledge graph and 3D-rendering toolchain

### AUTHORS

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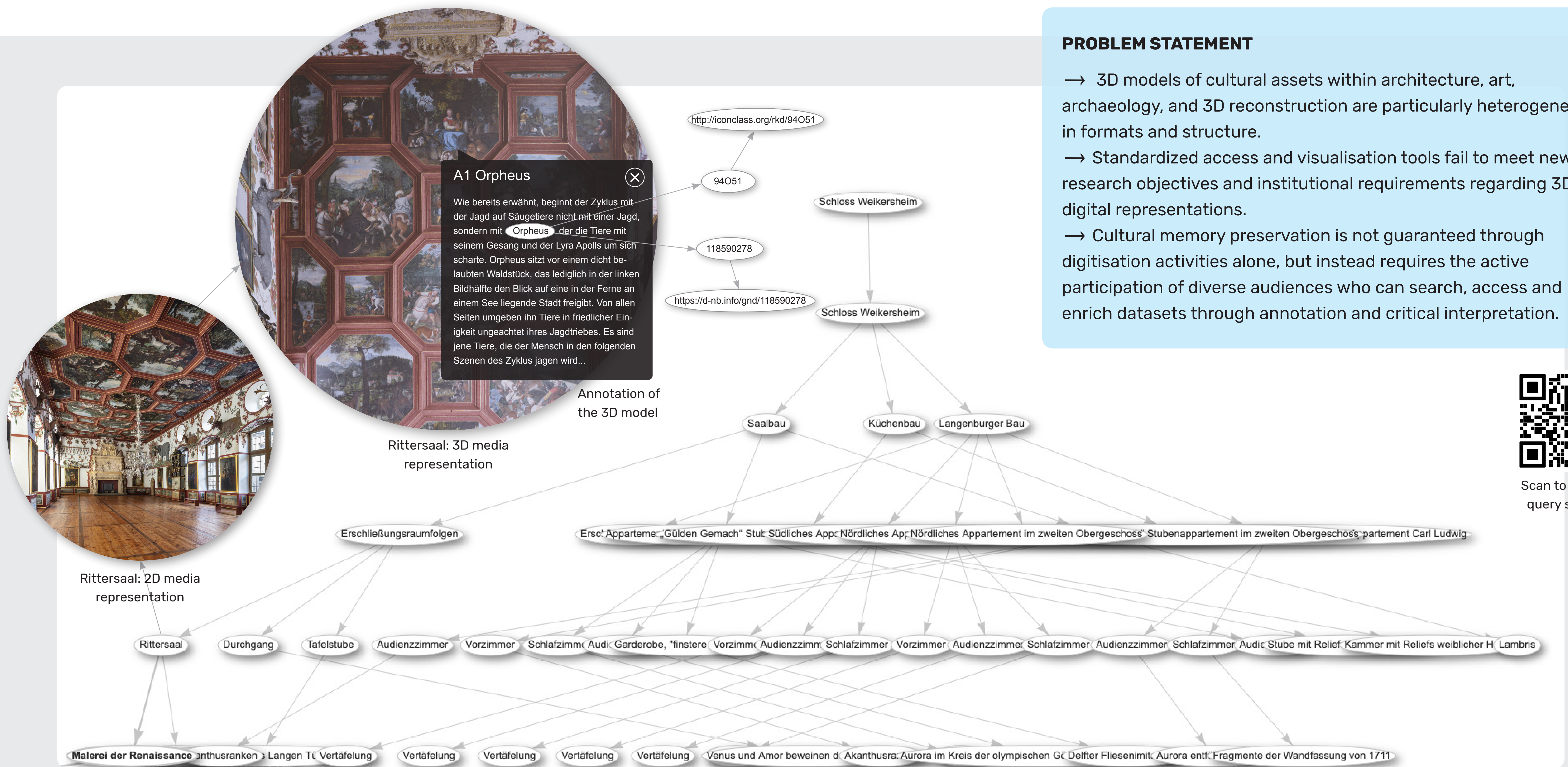
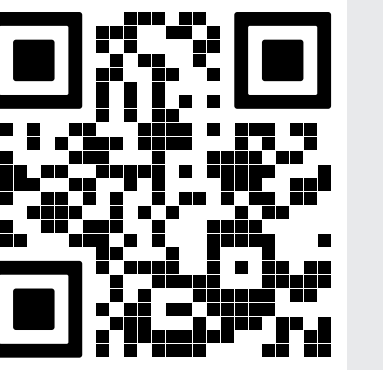


Fig. 1. Graph visualisation of a SPARQL query showing the relations between building, building sections and artworks from the Weikersheim sample dataset. It also shows the future possibility of an automated NER in annotation text snippets with integration into the Wikibase-enabled LOD graph.

### PROBLEM STATEMENT

- 3D models of cultural assets within architecture, art, archaeology, and 3D reconstruction are particularly heterogeneous in formats and structure.
- Standardized access and visualisation tools fail to meet new research objectives and institutional requirements regarding 3D digital representations.
- Cultural memory preservation is not guaranteed through digitisation activities alone, but instead requires the active participation of diverse audiences who can search, access and enrich datasets through annotation and critical interpretation.



Scan to access query source

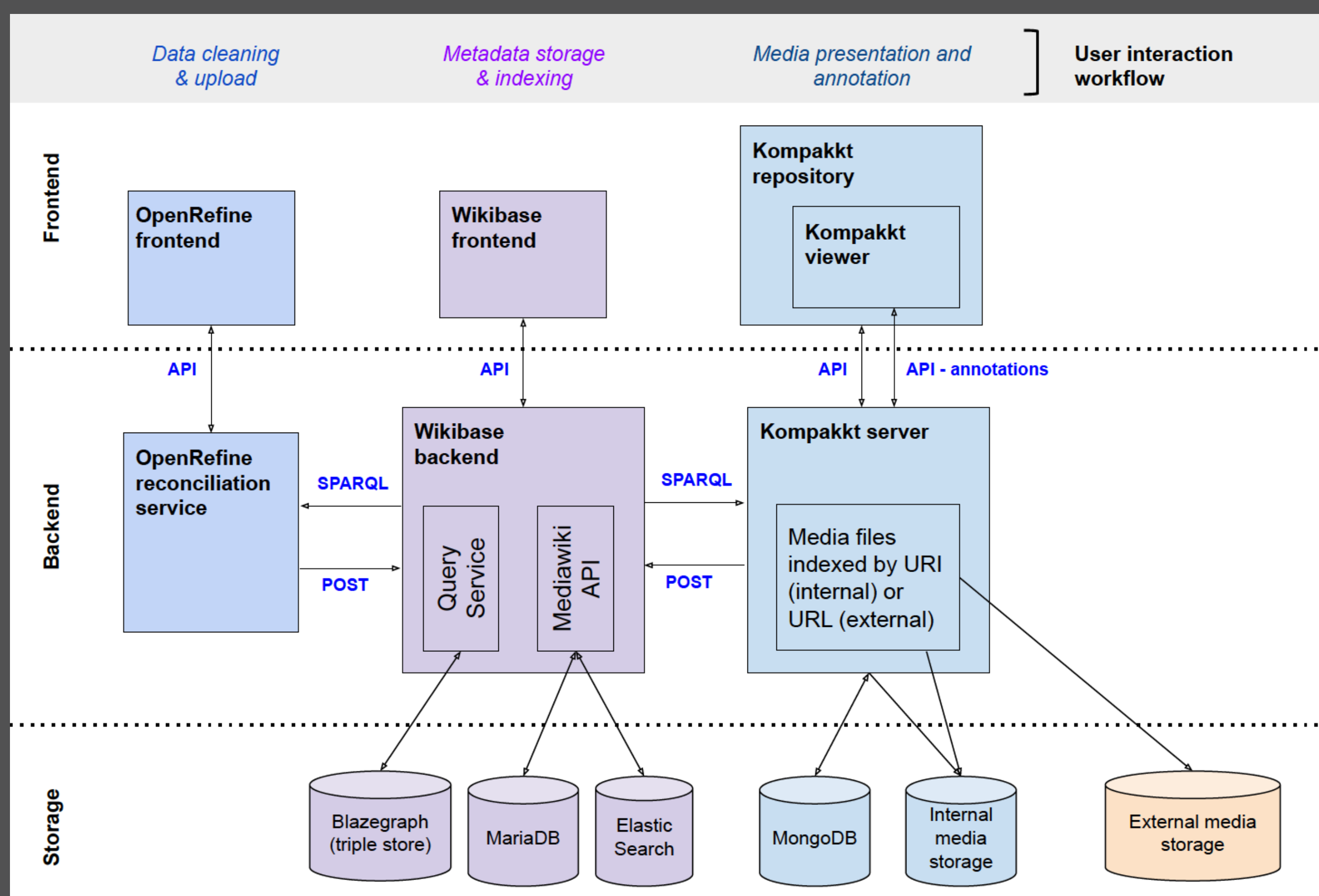


Fig. 2. Simplified diagram of the MVP architecture: A modular system of open source components follows three core user interaction workflows.

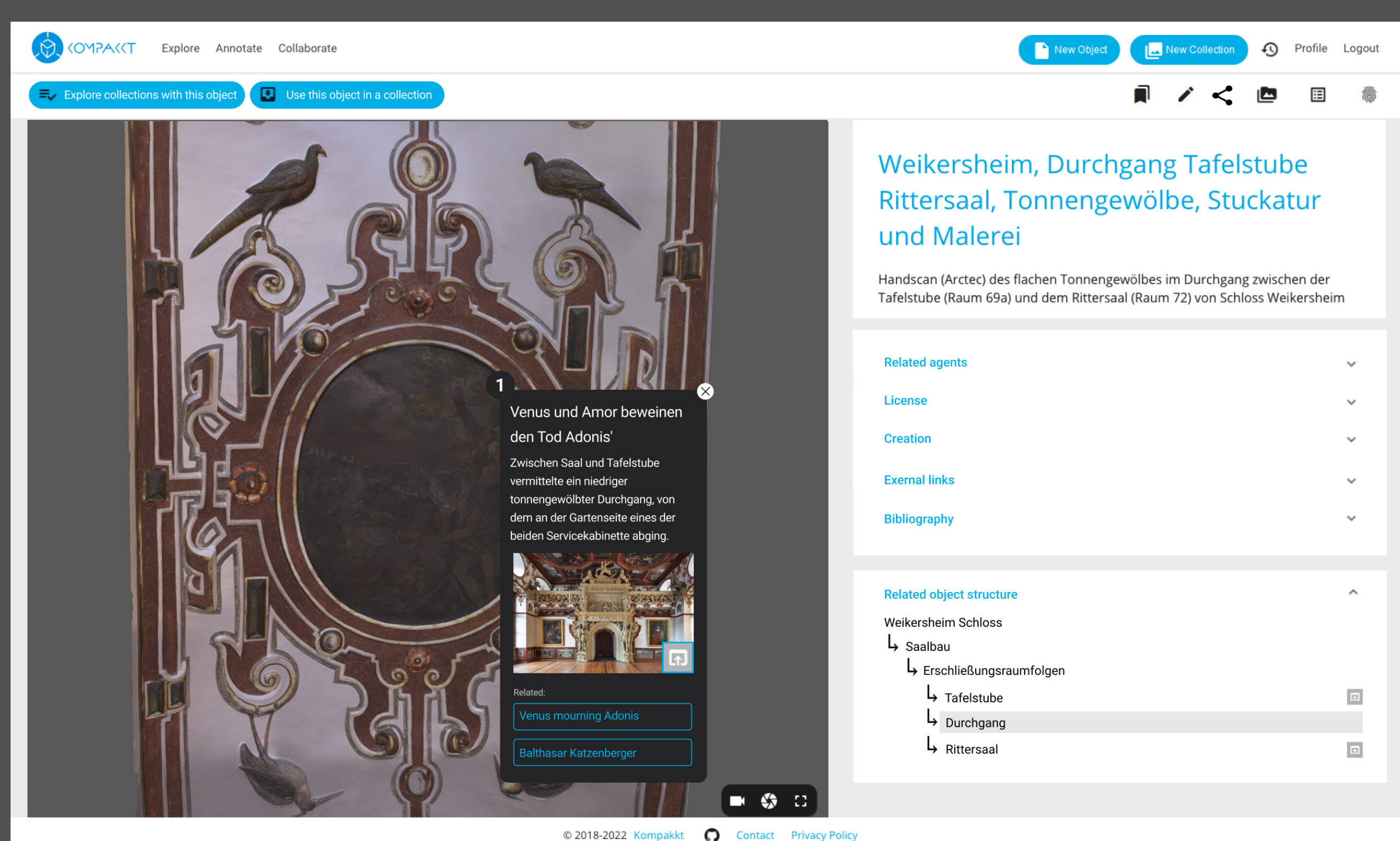


Fig. 3. View of a 3D object rendered in Kompakt showcasing metadata and annotations derived from the connected Wikibase repository.

### METHODOLOGY

To address this knowledge gap, we are developing a FOSS toolchain for the annotation of 3D data within a knowledge graph environment in the context of **NFDI4CULTURE**, *Task area 1: Data capture and enrichment*. The project builds on several existing FOSS tools:

- **OPENREFINE**, a data cleaning, reconciliation and batch upload tool;
- **WIKIBASE**, a suite of services for managing Linked Open Data;
- **KOMPAKT**, a 3D- and multimedia viewer with collaborative annotation features.

The toolchain is designed with a modular architecture wherein all data is uploaded to a Wikibase repository via POST requests and it can be queried via a dedicated SPARQL endpoint. Data across all stages of the data workflow is readily accessible and editable via graphical user interfaces, making the toolchain accessible to a broad public of researchers and data managers.

### MVP AND CASE STUDY DATA

- In **PHASE 1** of this project, we developed an **MVP** (a minimum viable product) which takes a specific architectural case study – reconstruction work and 3D modelling of Weikersheim Castle in Germany and its painted interiors.
- This work has been carried out in close collaboration with experts from the fields of architecture, digital reconstruction and art history in the context of the *Corpus der barocken Deckenmalerei in Deutschland* project (<http://www.deckenmalerei.eu/>).
- This case study allowed us to work with real world data and develop all aspects of the toolchain with concrete user requirements in mind.

### STANDARDS-COMPLIANCE AND OUTLOOK

- The toolchain follows FAIR principles, and adopts common standards like PIDs and the W3C annotation model.
- It allows linking 3D objects and annotations, and their cultural context (e.g. historical people and places), to the broader semantic web and various national and international authority records (GND, Iconclass, VIAF and more).
- During **PHASE 2** of development, we will focus on NER automation within annotation text snippets. In addition, we plan for multiple, separate instances of the toolchain to be able to serve different specialist communities, since different user requirements, data types and vocabularies for describing the data may exist in each case.

### CREDITS AND ACKNOWLEDGEMENTS

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