

Semantic x-Lab Kick-Off Event

Oliver Knodel, David Pape, Martin Voigt, Manja Luzi-Helbing, Marc Hanisch, Felix Mühlbauer,
Andrew K. Mistry, Ivan Knezevic, Alexander Kessler



In the kick-off meeting, you can expect:

- An overview of the project's scope and objectives
- An introduction to related projects
- Presentation of selected use cases
- Practical unit





HELMHOLTZ
Metadata Collaboration



Semantic x-Lab Kick-Off Event

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Objective for today

- We would like to take into account a **wide range of requirements** from our community in our Semantic x-Lab project.
- The presentation of similar projects serves to develop synergies wherever possible.
- Two different **use cases** will be presented as part of the project.
- We have developed a Miro board to **create a shared knowledge graph** (KG), answer questions about the future use of our SxL KG, and evaluate the **wishes and requirements** for the provision and search of information.

*This is only an
example and not our
final product.*



Agenda

10:00 AM → 10:20 AM

Introduction to the Project and the Team

10:20 AM → 10:40 AM

Project Overview

10:40 AM → 10:45 AM

Break

10:45 AM → 11:25 AM

Related Projects

- Helmholtz KG
- Knowledge Graph Infrastructure at NFDI

11:25 AM → 11:55 AM

Use Cases

- Use Case I — Data and Metadata at High-Power Laser-Plasma-Experiments
- Use Case II — Determination of stable metal(loid) isotopes in soil samples

11:55 AM → 12:00 PM

Break

12:00 PM → 12:45 PM

Practical Unit / Group Discussion

12:45 PM → 1:00 PM

Closing and Next Steps



I. How it started

The HELIPORT project in 2020



HELIPORT — The Helmholtz Scientific Workflow Platform (Cohort 2020)

“ The HELIPORT project aims at developing a platform which accommodates the **life cycle** of a scientific project and links all corresponding programs, **systems** and **workflows** to create a more **FAIR and comprehensible** project description.

HELIPORT HELmholtz Scientific
Project WOrkflow PlaTform

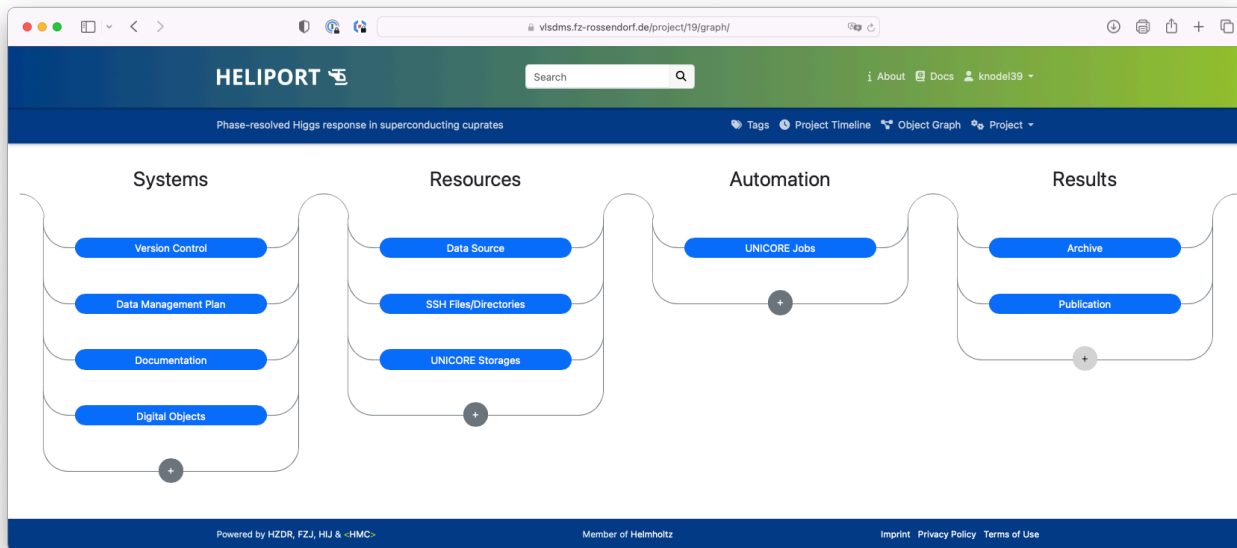
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Project Members:



Funded by:



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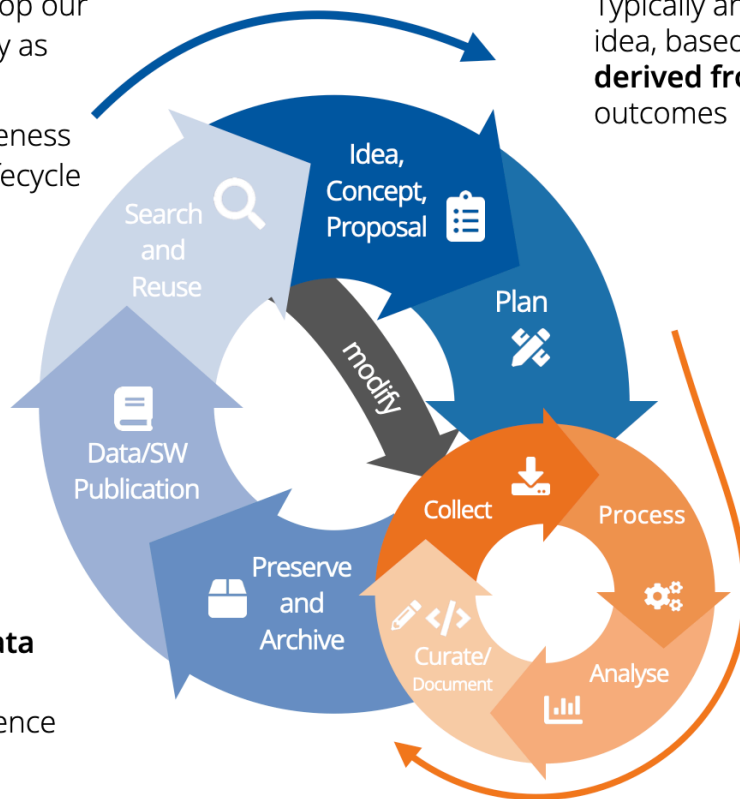
Data Management Lifecycle

- Necessary in order to develop our services as comprehensively as possible.
- Should also create an awareness for all components of the lifecycle



Publication of **data** and **metadata** is at the end of a typical research lifecycle and can be the starting point for new iteration cycles...

Archive or (additional) **data publication** to provide sustainable and open science



Typically an experiment starts with an idea, based on a research question, **derived from available research** outcomes

→ Valuable metadata in our proposal systems

During experiment **documentation** and **metadata** curation are essential for a **comprehensible** experiment



HELIPORT — Overview

HELIPORT
HELMholtz Scientific
Project WORKflow Platform



Software
Publication

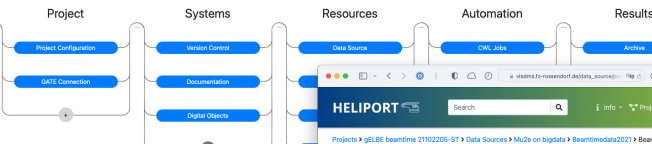


Workflow



Scientific
Publication

Project Graph: gELBE beamtime 21102205-ST



HELIPORT — Community

— Growing community with interested partners:



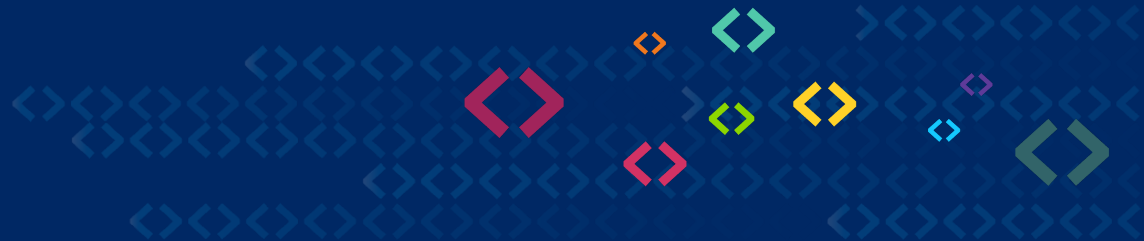
HELIPORT Community Workshop 2023

- Spin-off HMC project in the field of laser plasma metadata: [HELPMI \(Cohort 2022\)](#)
- The future of [HELIPORT](#):
 - Helmholtz-wide service under new domain: [heliport.helmholtz.cloud](#)
 - Productive use at beam lines at [HZDR](#) and [HIJ](#)
 - Establishment as [Software](#) and [AI model](#) management platform.



II. How it continued

The ALAMEDA project in 2021



ALAMEDA — A Scalable Multi-Domain Metadata Management Platform (Cohort 2021)

“ The ALAMEDA data management environment covers five main categories of metadata: **observations** and measurements, **samples** and data history, **sensors** and devices, **methods** and processing, and **environmental properties**.

Fields:



Project Members:



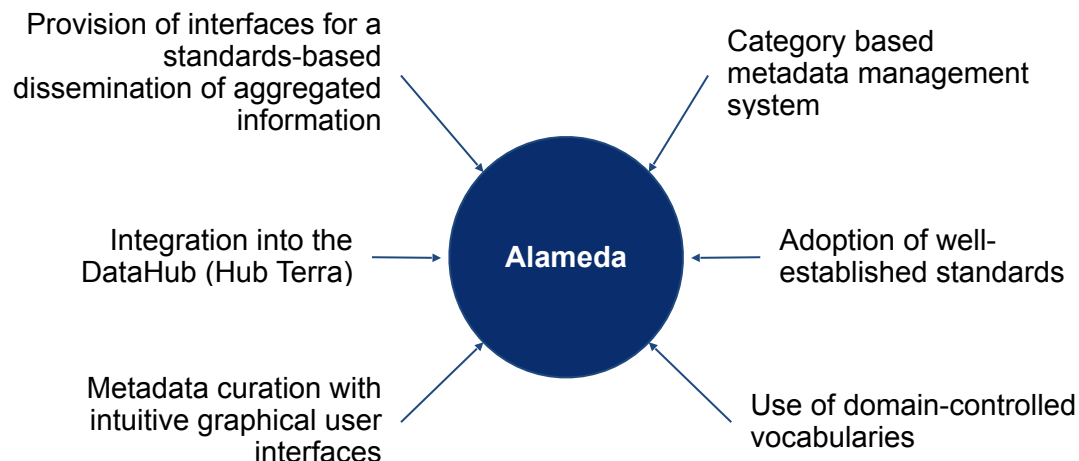
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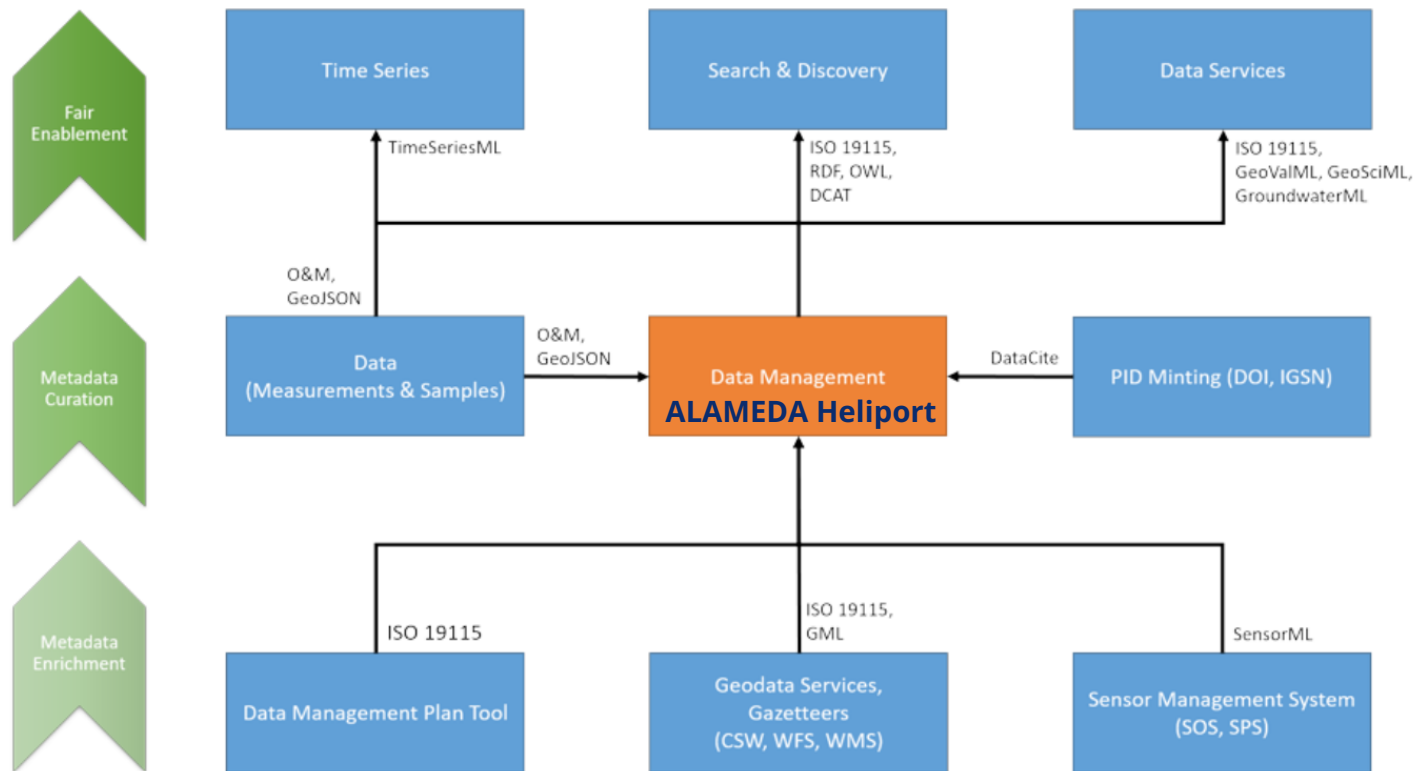
Funded by:



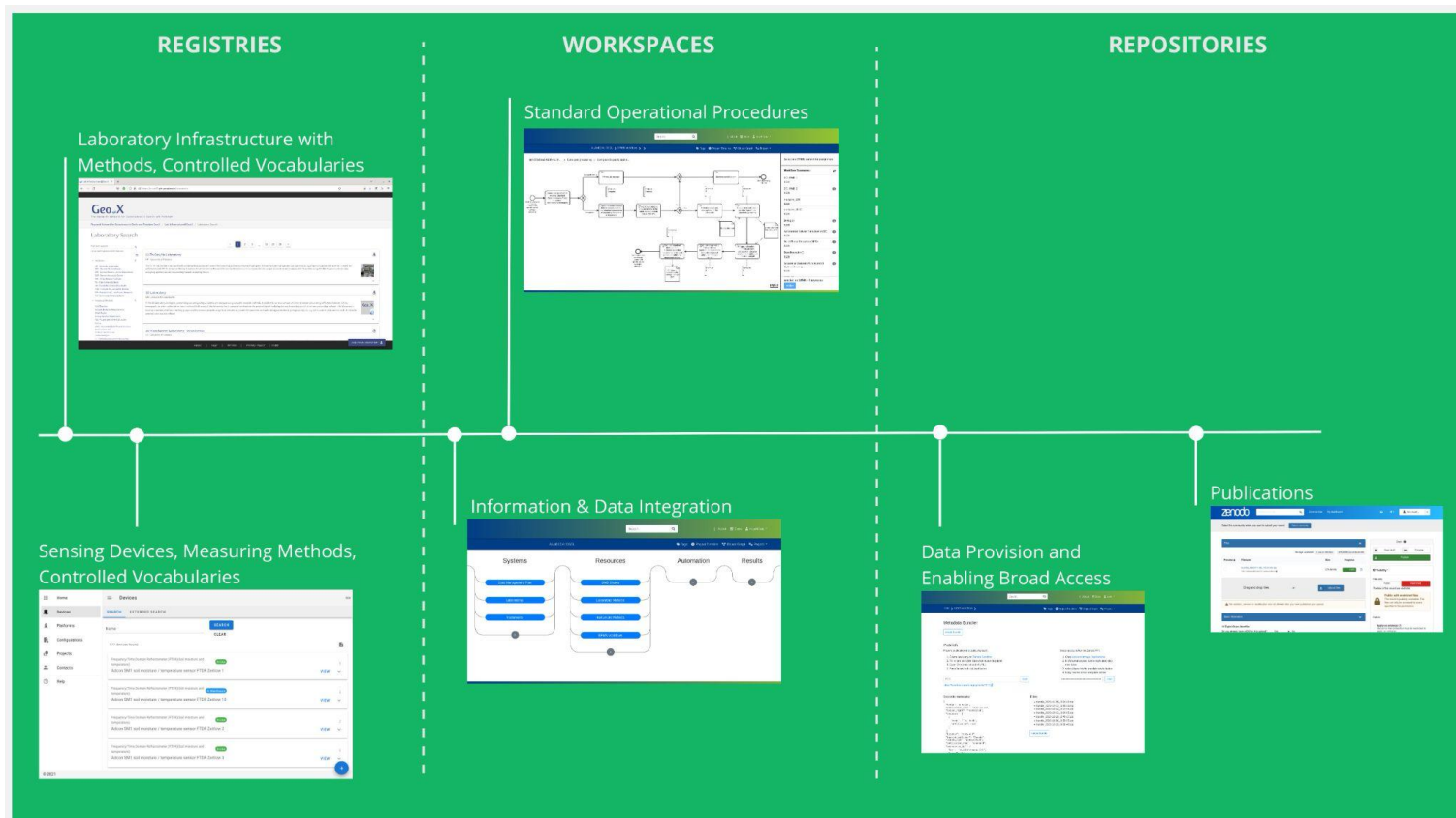
ALAMEDA



ALAMEDA — Data Management with “ALAMEDA Heliport”



ALAMEDA — Schematic Concept



IV. Where we are now

The joint project Semantic x-Lab (2024)

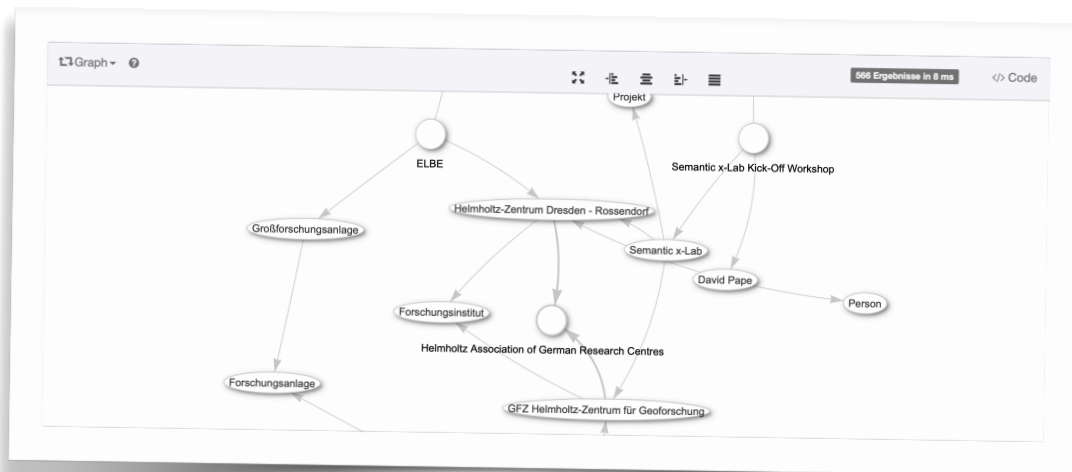


Semantic x-Lab — Something with Metadata and Knowledge Graphs (Cohort 2024)

“ Semantic x-Lab aims to **interlink** and **contextualise** the metadata from four institutes and two research fields through a distributed **knowledge graph** developed in collaboration with users, enabling **cross-domain exploration** and the generation of **new insights**.



Semantic x-Lab



Fields:



Project Members:



Observer:



HELMHOLTZ
Open Science

Funded by:



HELMHOLTZ
Metadata
Collaboration

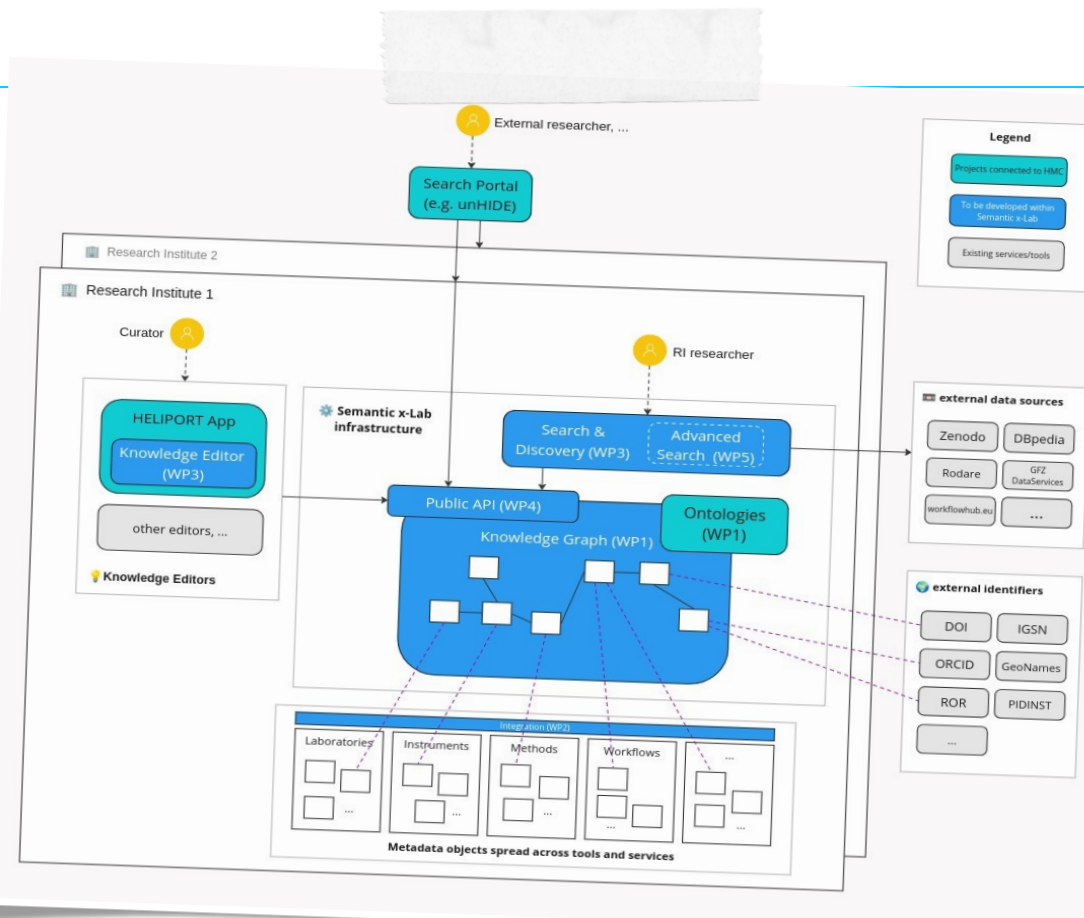
Semantic x-Lab — The Vision

Planned ecosystem:








- Distributed knowledge graph connects **internal** and **external metadata sources**
- Approval and curation of metadata for (external) use by the owner via a **knowledge editor**
- Internal **search and discovery**
- Cross-institutional connections and relations

Outcome:

- Making new, previously **unknown relationships** visible
- Provision of **curated KG** for the next levels (e.g. Helmholtz KG)



Semantic x-Lab — The Plan

- WP1**  **Definition of concepts** for a knowledge graph of interlinked metadata with established, application-specific ontologies and implementation of a local graph database infrastructure
- WP2**  **Integration** of existing and new **laboratory BPMN workflows, tools, services** and data repositories into the ontologies
- WP3**  Graph database-driven search and discovery service provided by **knowledge editors** for typical scientific use-cases at RIs
- WP4**  Public **metadata endpoints (API)** that follow FAIR principles for interlinked metadata Integration of external data sources
- WP5**  Outlook towards an **advanced search in community standards** and future extensions
- WP6**  Considerations and **guidelines** for long-term adoption of Semantic x-Lab infrastructure at RIs and **onboarding** of new metadata providers
- WP7**  Project & **Community Management**

Semantic x-Lab — Kick-Off Workshop Jun 11, 2025, 10:00 am



Definition of use-cases, requirements and roles



Identifikation and Integration of suitable metadata and vocabularies on labs, instruments, methods, ...



Feedback on the usage of knowledge graphs



Semantic x-Lab Kick-Off Meeting

ONLINE EVENT

Wednesday Jun 11, 2025, 10:00 AM → 1:00 PM Europe/Berlin

<https://hzdr-de.zoom-x.de/j/63711319194?pwd=sxZ4EzK4pkjI9PLshAc90bRSH30kvC.1> (Zoom)

Description



Kick-Off Semantic x-Lab

"Semantic x-Lab" aims to address the growing need to compare experiments and procedures across communities to gain knowledge by establishing relationships between involved resources and engaging the communities in this process. It will implement a FAIR knowledge graph which can be embedded into each institution's infrastructure, connecting lab workflows, instruments, tools, samples and data using established ontologies. A semantic search will provide novel means for discovering research artifacts and interrelations, and provide the basis for integration into third party knowledge bases.

Zoom link: <https://hzdr-de.zoom-x.de/j/63711319194?pwd=sxZ4EzK4pkjI9PLshAc90bRSH30kvC.1>

Schedule still subject to change.

events.hifis.net/e/sxl-kick-off

Related Projects and Use Cases



Practical Unit

