Thinking data management on different scales

Susanne Kunis

Research Data Management

- Logistical necessity
- Ensures Integrity, reproducibility and transferability
- Protects data loss
- Fosters collaboration
- Provides transparency

INDIVIDUAL

INTERNATIONAL

	01 INITIAL	02 BASIC	03 DEVELOPMENT	04 MANAGED	05 OPTIMIZED
Status:	Disorganised, ad hoc				Deploy inter domain crosswalks
Management:	Different data structures, subjective documentation; unnecessary data duplication, transfer, conversion; no central data storage and access interface; no objective/strategy				Data are rich on context (full semantic); Standardised API; harmonized and interoperable data; coherence in format and context
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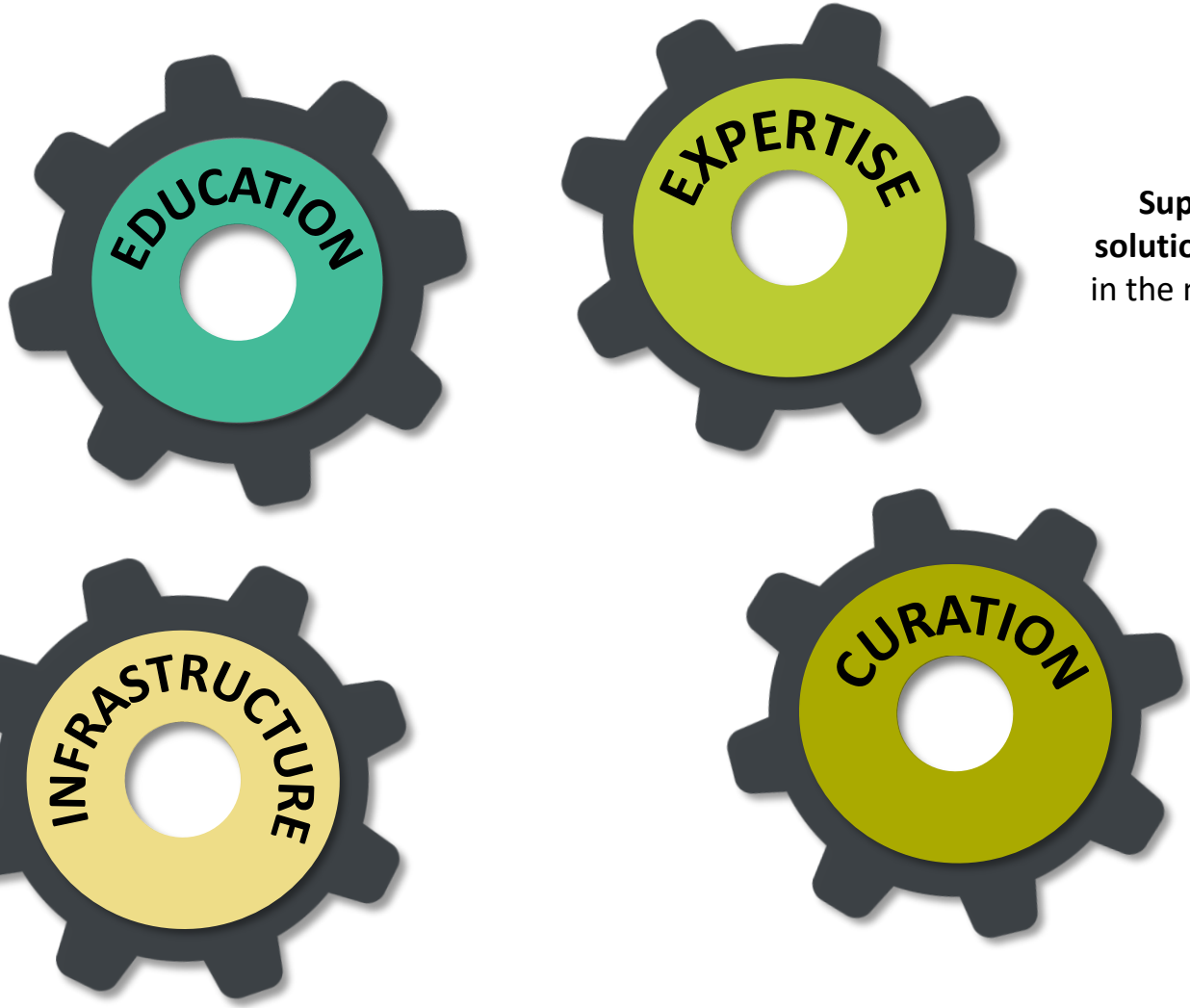
Interoperability:	low				high
	„If I want to share data, I coordinate it directly with my colleague"				*„ I find that I can easily discover, access, combine and publish data".*

Important spokes in the wheel

Raise awareness of research data management importance; **Teaching** data management **technics** and **tools**



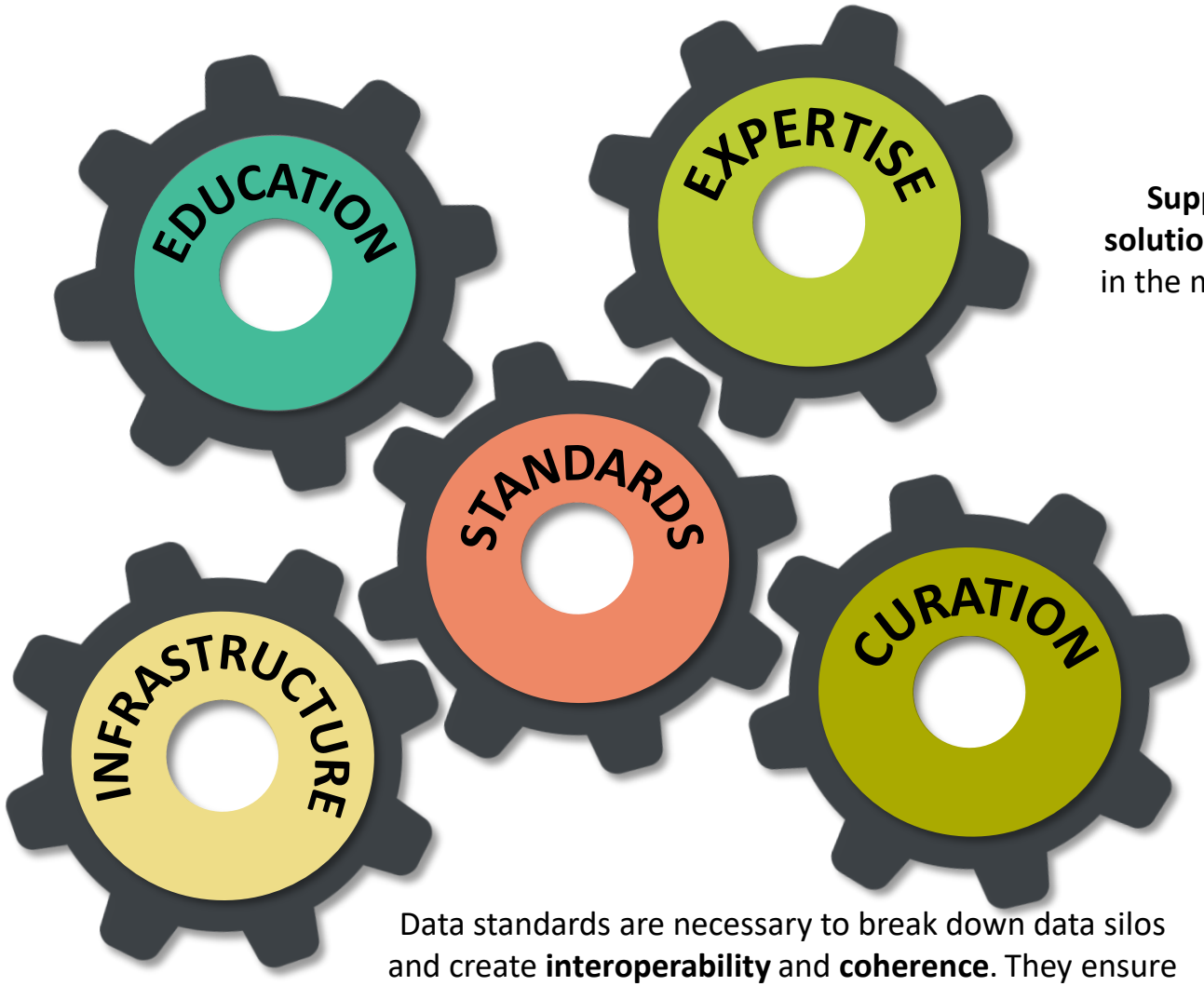
Support and **customized solutions** for specific problems in the management of research data

Technical **infrastructure** and related **services** that support researcher in data management throughout the research cycle

Ensure **quality**, add metadata, and ensure compliance with **standards and policies**.

Important spokes in the wheel

Raise awareness of research data management importance; **Teaching** data management **technics** and **tools**



Support and **customized solutions** for specific problems in the management of research data

Technical **infrastructure** and related **services** that support researcher in data management throughout the research cycle

Ensure **quality**, add metadata, and ensure compliance with **standards and policies**.

Data standards are necessary to break down data silos and create **interoperability** and **coherence**. They ensure that data retain their value and meaning and are usable, consistent and accurate.

Integration of data management in an existing ecosystem

Department Biology

Research groups

19

- Animal Physiology
- Behavioural Biology
- Bioanalytical Chemistry
- Biochemistry
- Biodiversity and Landscape Ecology
- Biology Didactics
- Biophysics
- Botany
- Cellular Communication
- Ecology
- Genetics
- Microbiology
- Molecular Cell Biology
- Molecular Cell Biophysics
- Molecular Infection Biology
- Neurobiology
- Plant Physiology
- Structural Biology
- Zoology

Department Biology

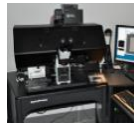
Research groups

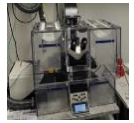
19

Facility & Service

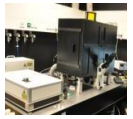
iBiOs

12 Light Microscopy
6 Electron Microscopy
5 Cytometry & FACS


DeltaVision


Leica SP5

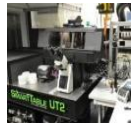

Lattice Light-Sheet


Olympus FV 1000


Olympus FV 3000

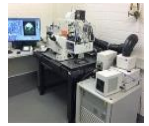

Olympus TIRF 1-LINE

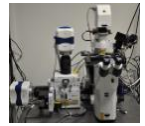

Olympus TIRF 3-LINE


Olympus TIRF 4-LINE FRAP


Olympus TIRF 4-LINE PAINT


Zeiss LSM 510


Zeiss 880 AiryScan


Zeiss Spinning Disk

Mass Spectrometry

Department Biology

Research groups

19

Facility & Service

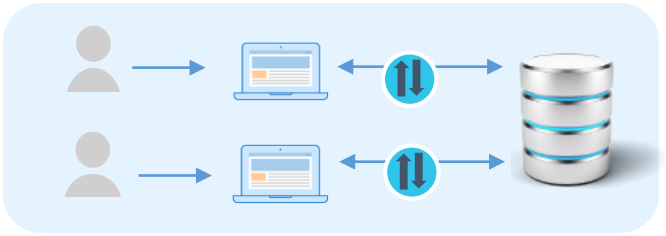
iBiOs

Research Center

CellNanOs

Mass Spectrometry

Ecosystem 2015



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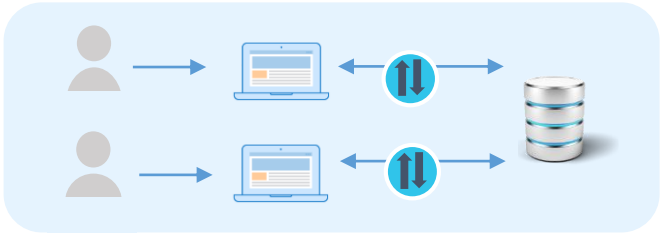
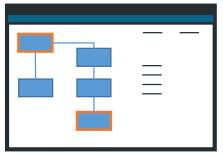


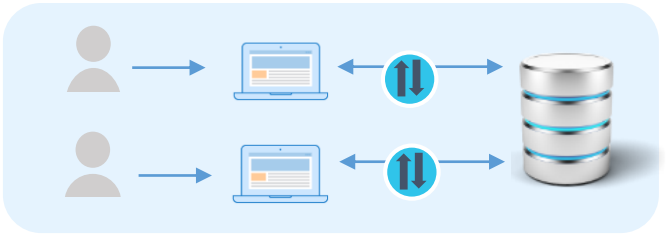


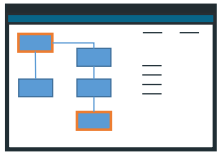
Research group member and desktop system

Research group specific server

Community/External Collaborators

Ecosystem 2015





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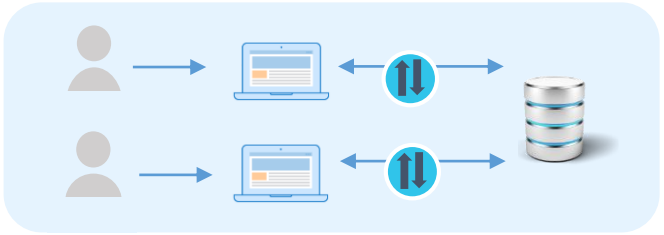


Research group member and desktop system

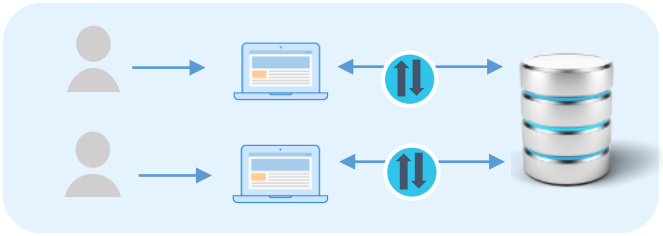
Research group specific server

Analysis workstations

Microscopy workstations

Community/External Collaborators

Ecosystem 2015



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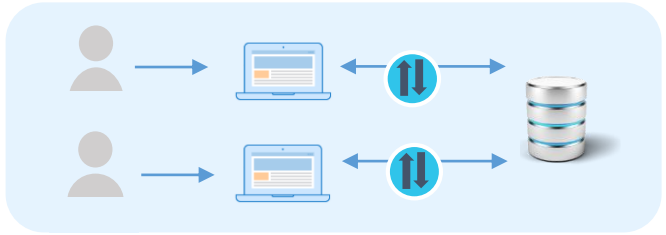
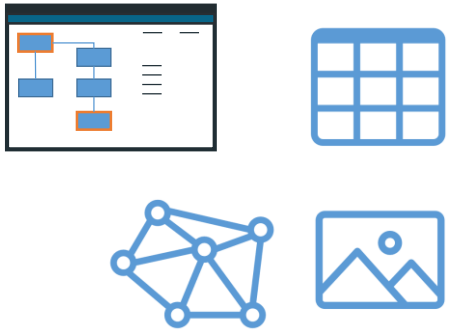




Research group member and desktop system

Research group specific server

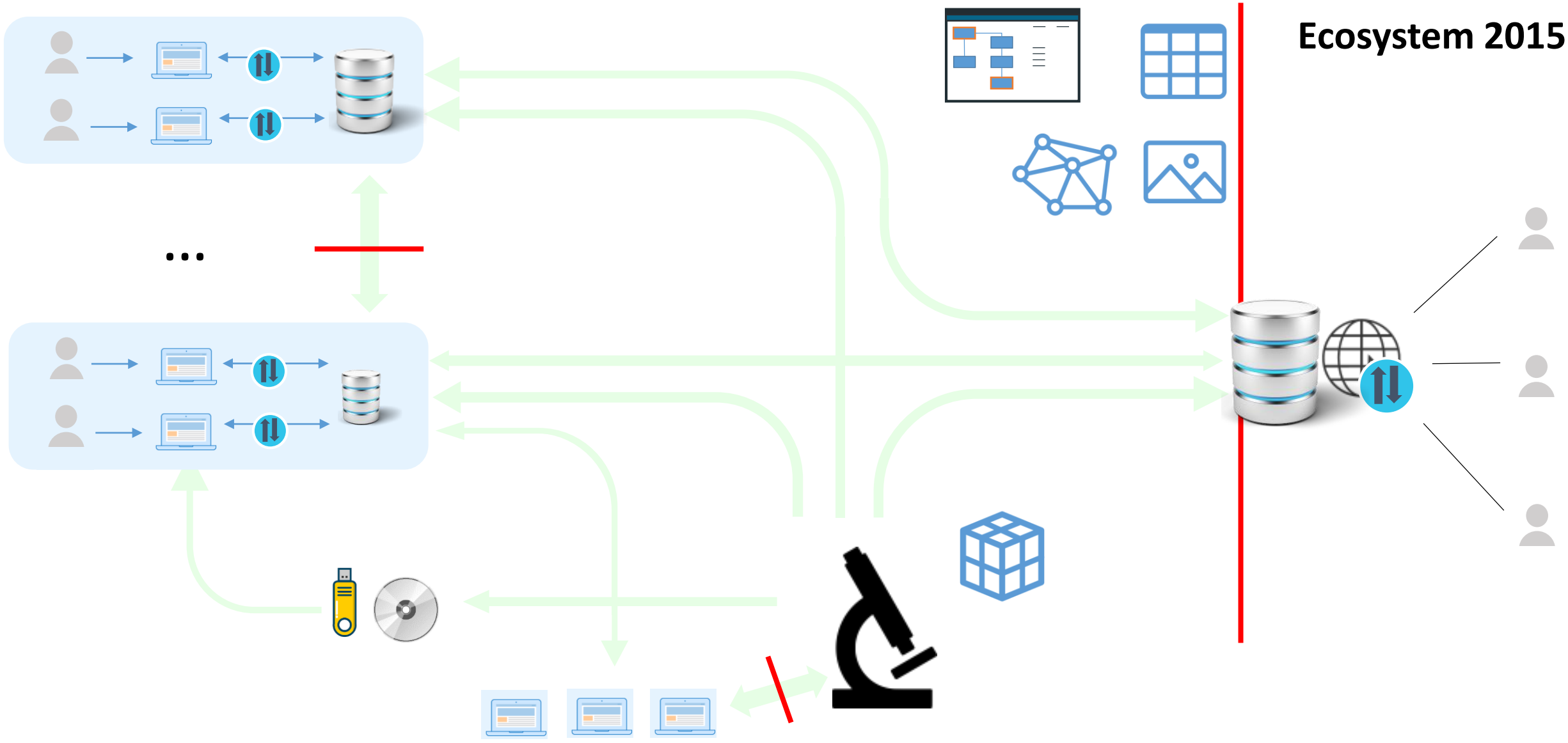
Analysis workstations

Microscopy workstations

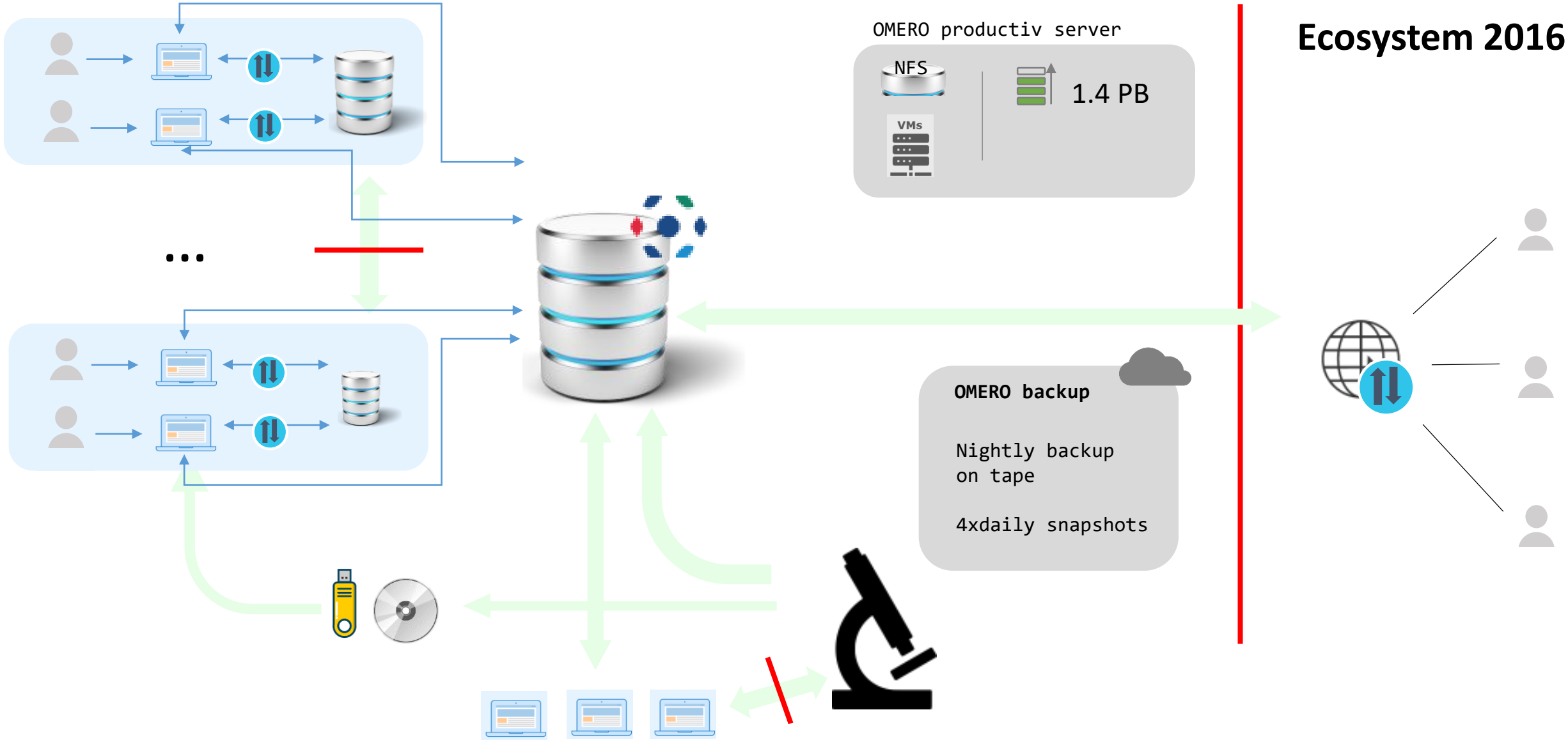
Multiple data formats

Community/External Collaborators

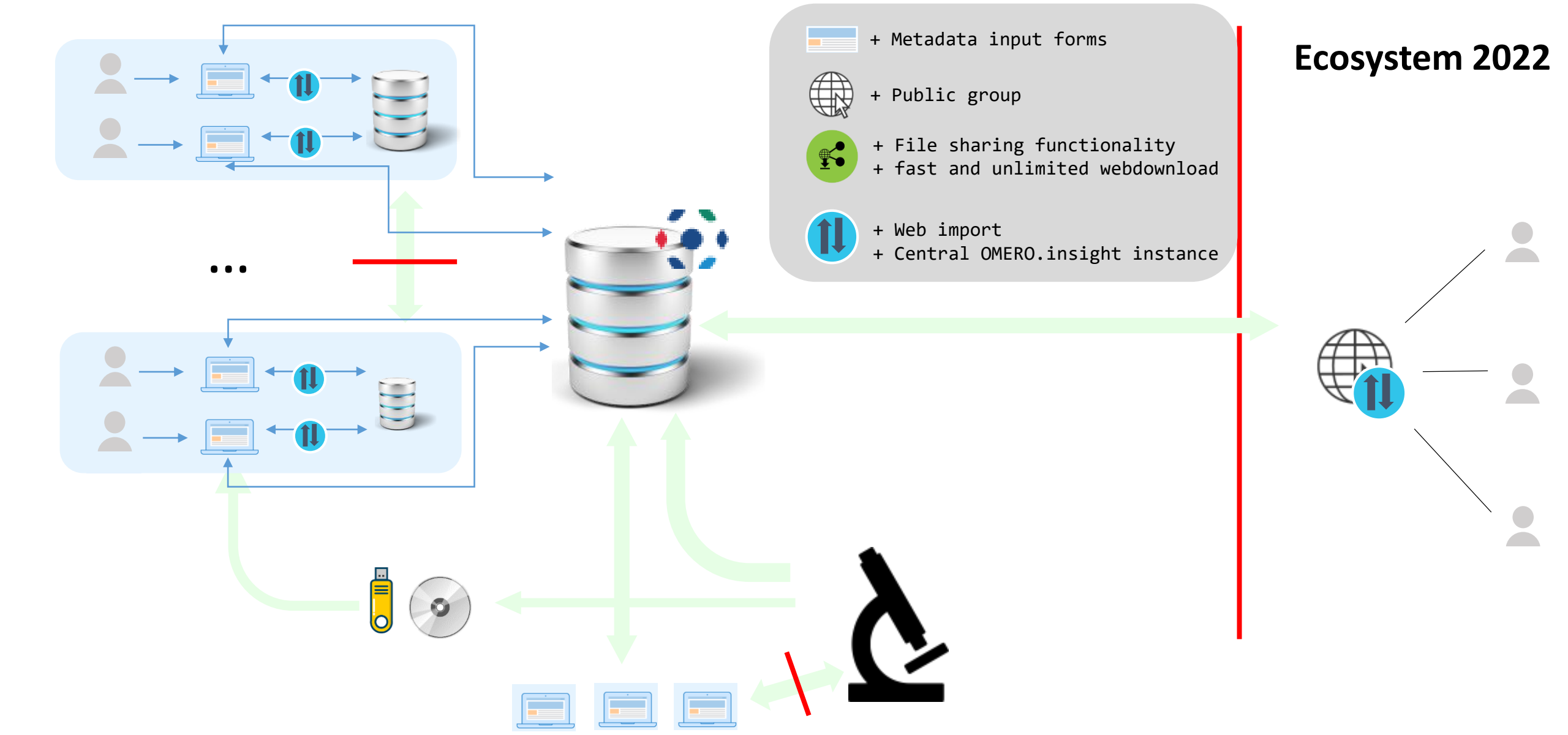
Ecosystem 2015



Ecosystem 2016

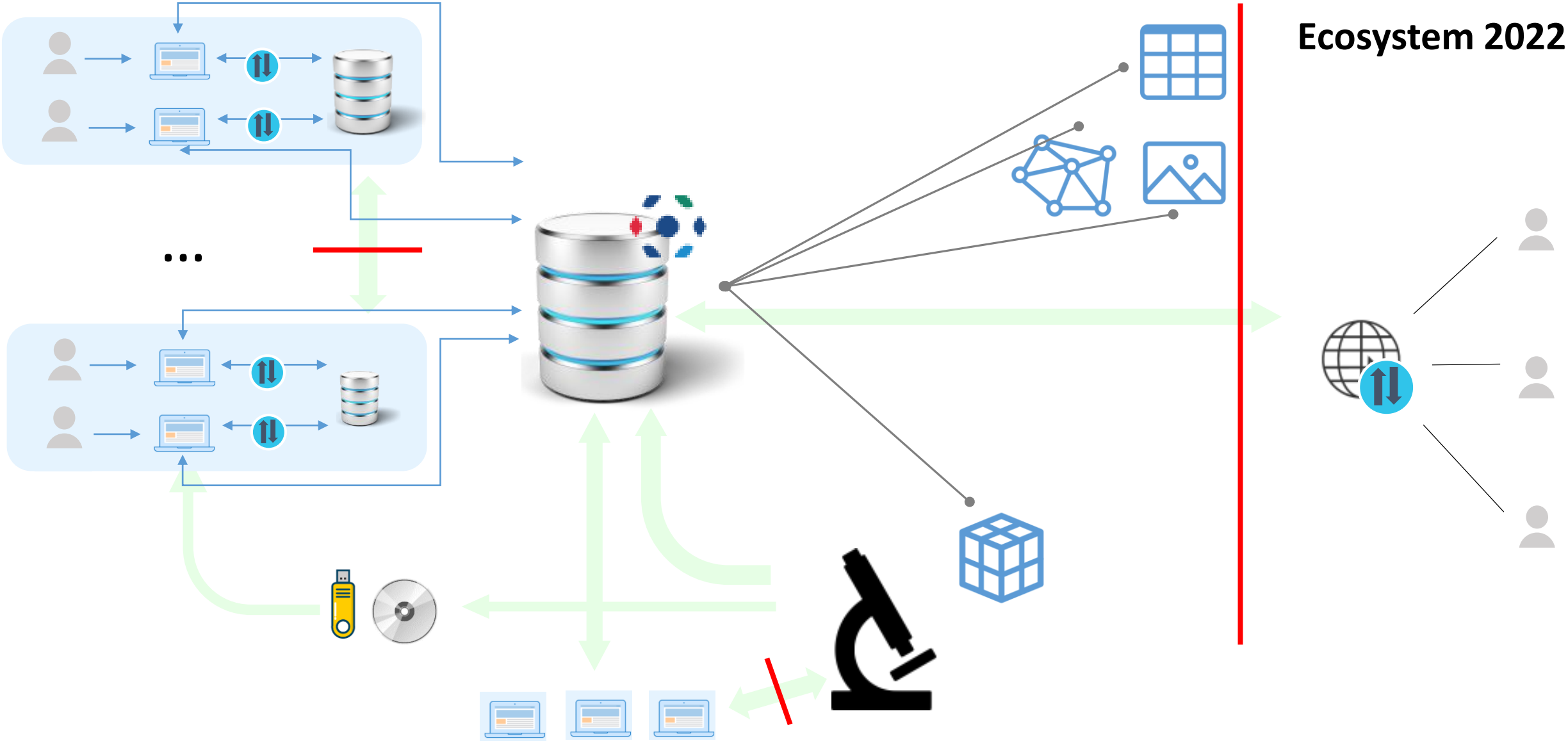


Ecosystem 2022



Research group member and desktop system | Research group specific server | Analysis workstations | Microscopy workstations | Central OMERO repository with extensions | Community/External Collaborators

Ecosystem 2022



Research group member and desktop system

Research group specific server

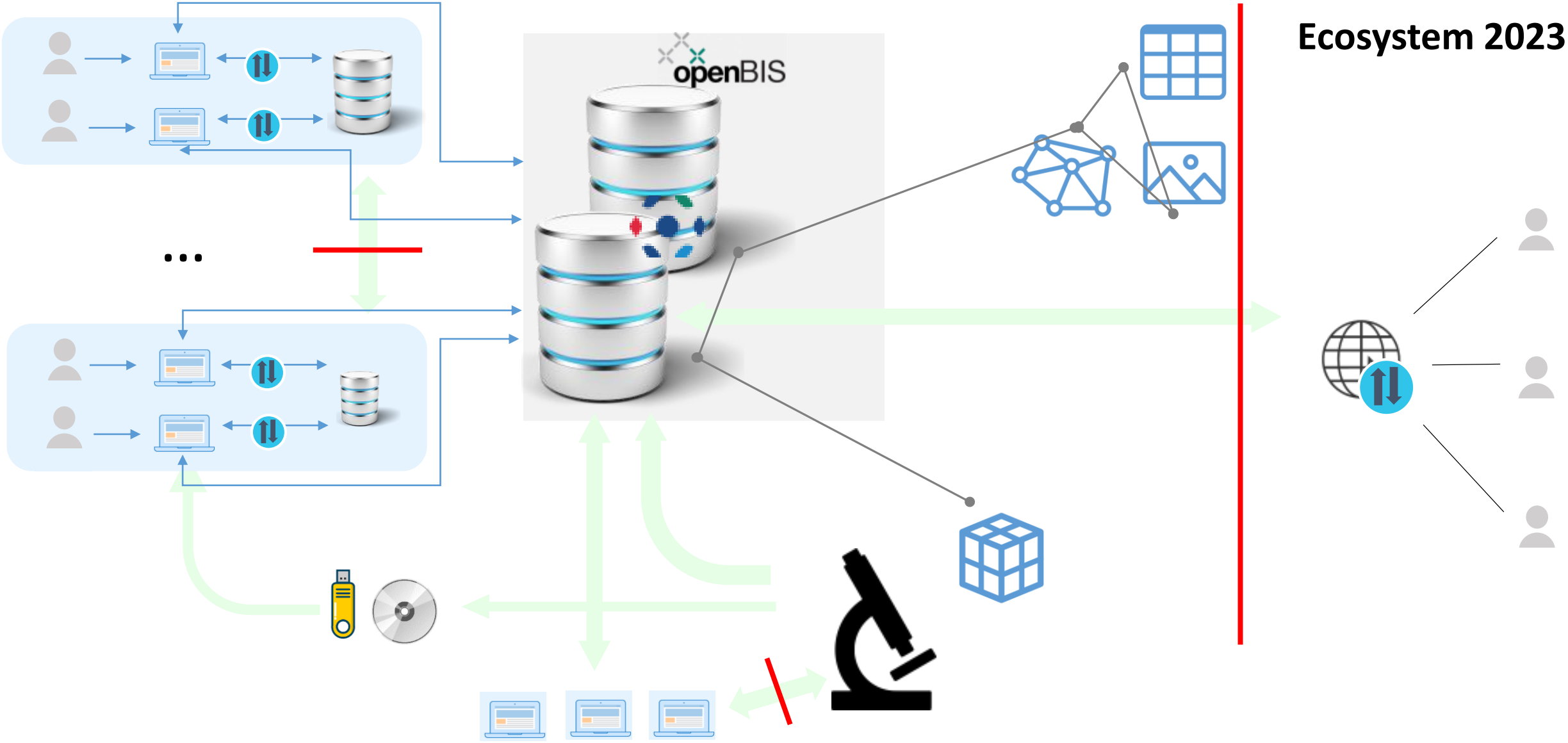
Analysis workstations

Microscopy workstations

Central OMERO repository -> Linking of different data types

Community/External Collaborators

Ecosystem 2023



Research group member and desktop system

Research group specific server

Analysis workstations

Microscopy workstations

Central OMERO & ELN instance
-> Linking of different data types

Community/External Collaborators

INDIVIDUAL PROJECT/GROUP INSTITUTIONAL

Change management and continious improvements

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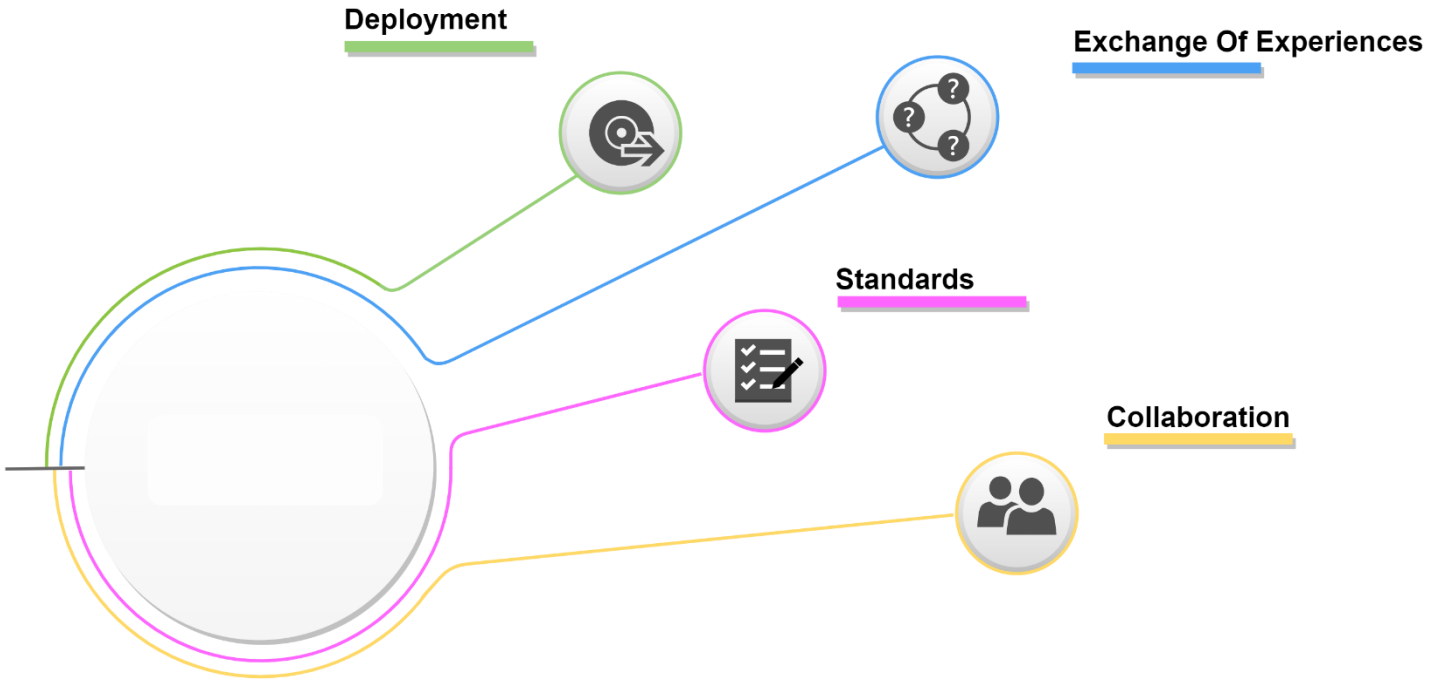
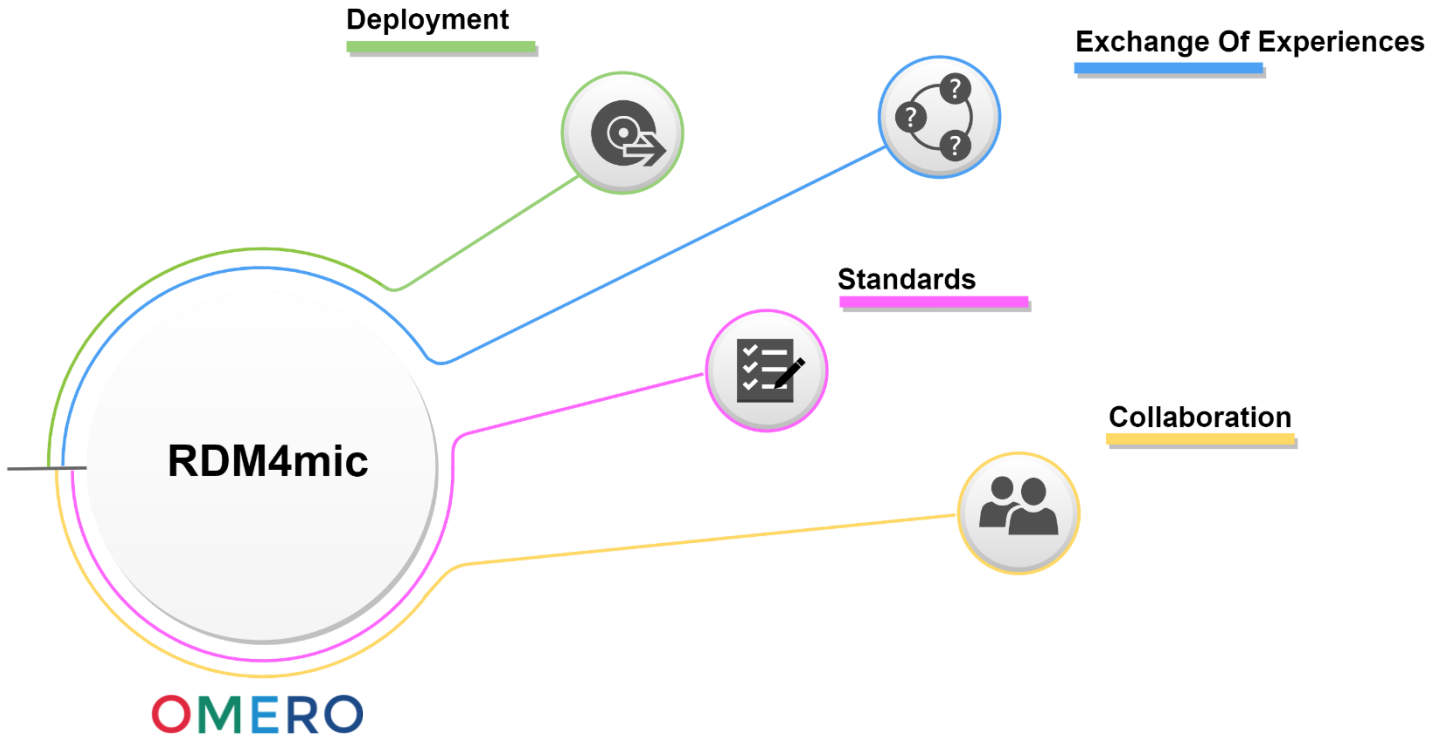
What about the others…



RDM4mic

“Research Data Management for Microscopy”

- Open for all
- >20 facilities involved
- Exchange of experience and knowledge transfer in terms of data management



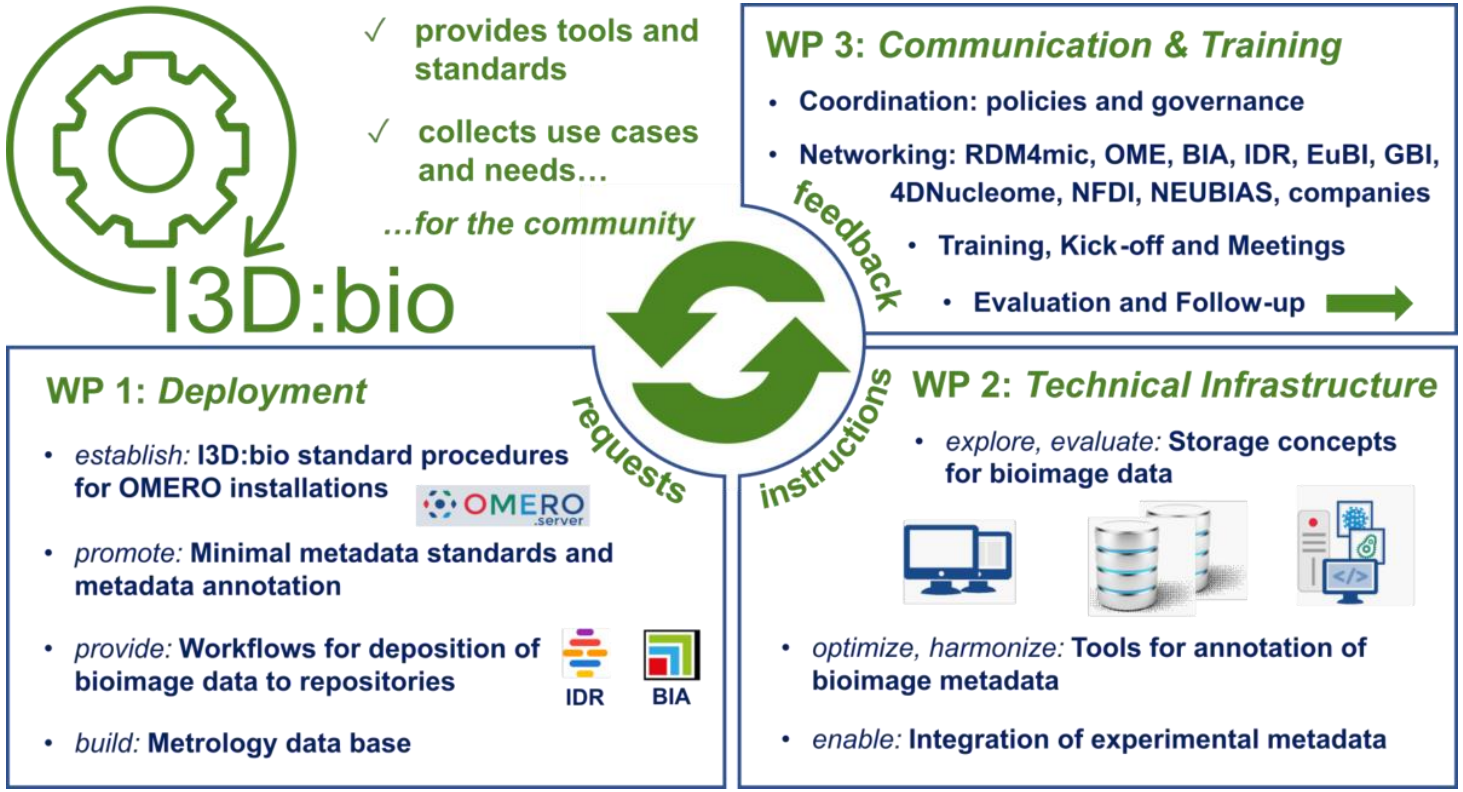
2017 2019

I3D:bio

Information Infrastructure for BioImage Data

2022-2024

Man power to implement the needs of tools, support and training with focus on OMERO and light microscopy



2017 2019 2021

Susanne Kunis | University Osnabrueck

INDIVIDUAL PROJECT/GROUP INSTITUTIONAL NATIONAL

Change management and continious improvements

RDM4mic

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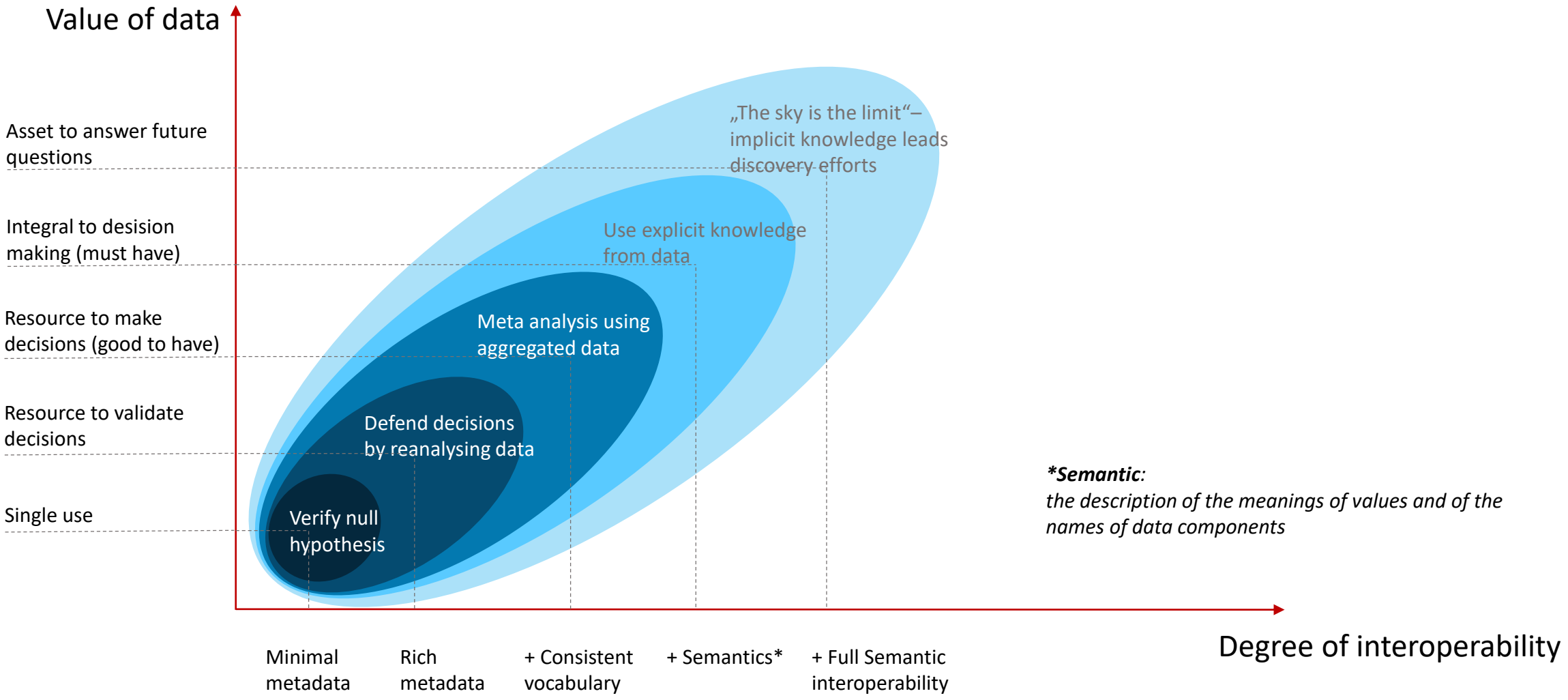
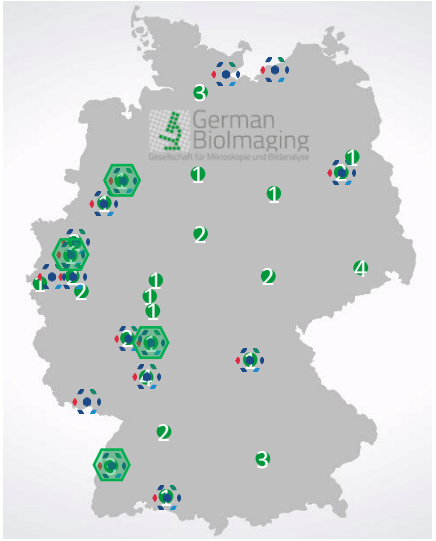
Research Data Management



***Semantic**:*
the description of the meanings of values and of the names of data components

NFDI4BIOIMAGE

2023-2028



Objective 4
Capacitate researchers for FAIR image data management

Objective 1
Champion the **standardization** of the „bioimage data“ type

Objective 3
Maximize the reach of **reproducible** image analysis workflows in the community

Objective 2
Provide scalable **infrastructure** for FAIR image data

National Researchdata Infrastructure for BioImaging:
Implement national infrastructure and standards

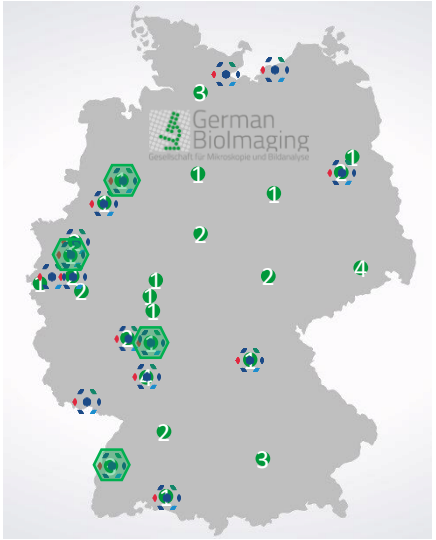
nfdi

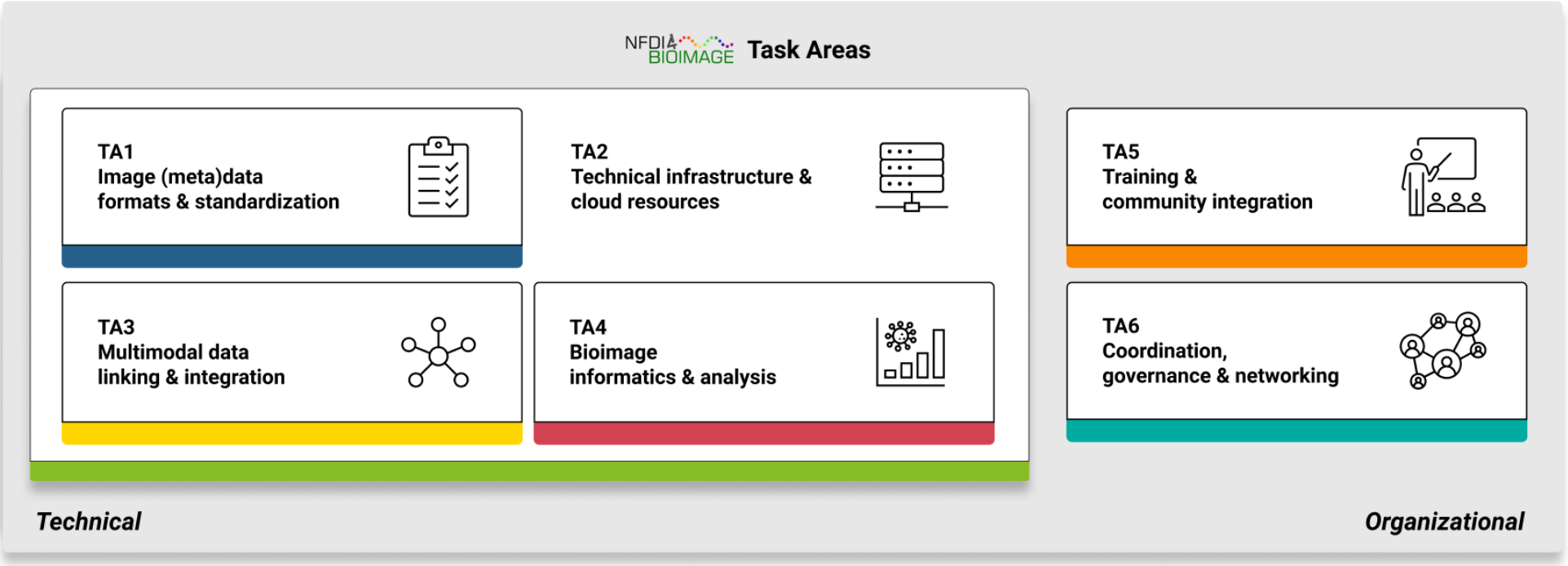
2017 2019 2021 2023

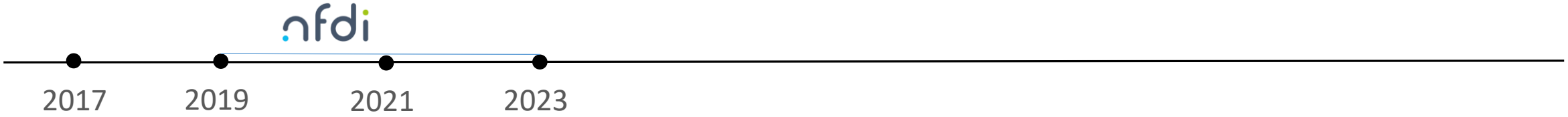
Stefanie Weidtkamp-Peters. (2023, June 22). NFDI4BIOIMAGE - National Research Data Infrastructure for Microscopy and BioImage Analysis - Online Kick-Off 2023. Zenodo. https://doi.org/10.5281/zenodo.8070038

NFDI4BIOIMAGE

2023-2028

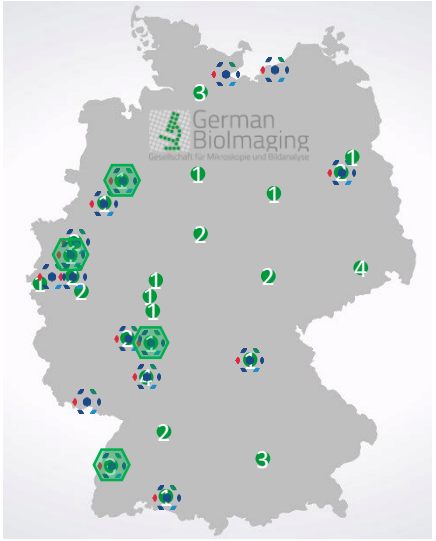




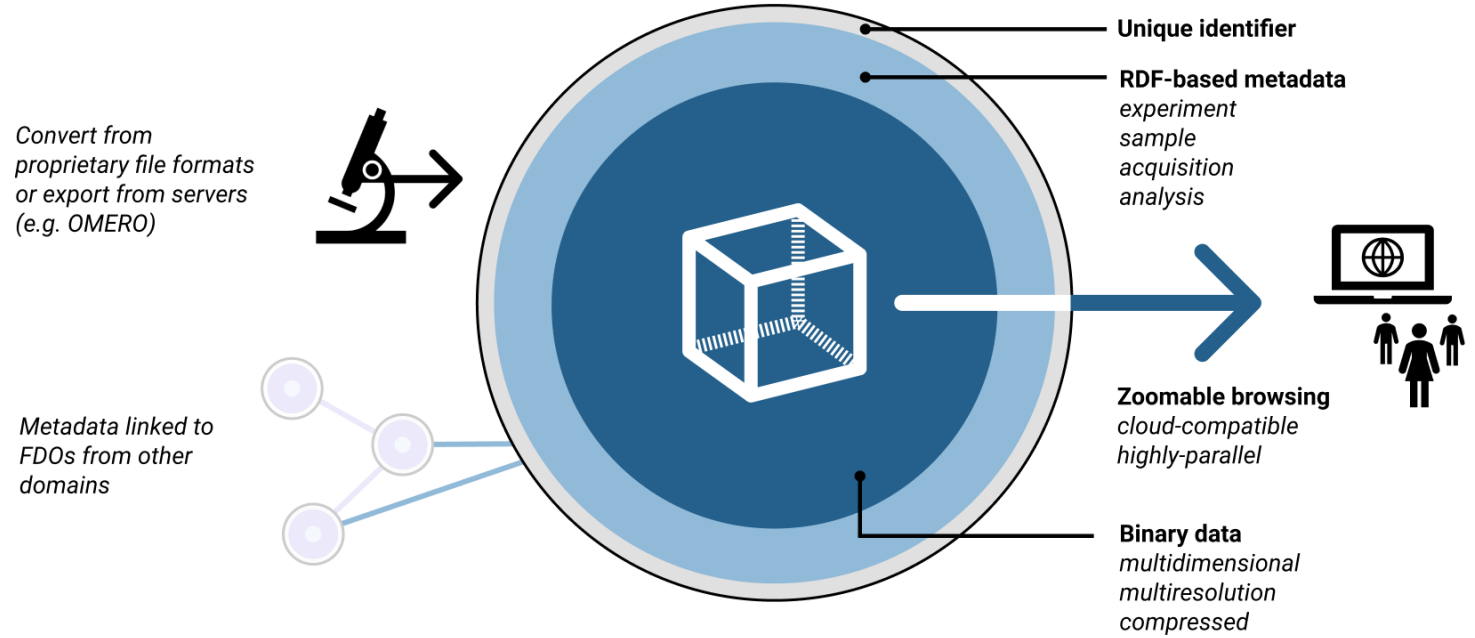


NFDI4BIOIMAGE

2023-2028
NFDI4BIOIMAGE



FAIR Image Objects (*FAIR-IO*), *an FDO-subtype for bioimaging*



NFDI4BIOIMAGE Consortium. (2021). Section 5.1 "Task Area 1: Image (meta)data formats and standardization)" Figure 8 (1.0.0). Zenodo. https://doi.org/10.5281/zenodo.7394675

nfdi

2017 2019 2021 2023

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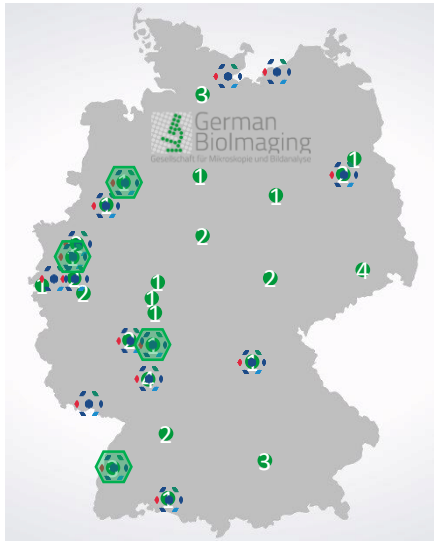
NFDI4BIOIMAGE

2023-2028

The success of NFDI highly depends on an institutional commitment.



Heinrich Heine Universität Düsseldorf

DEUTSCHES KREBSFORSCHUNGSZENTRUM IN DER HELMHOLTZ-GEMEINSCHAFT

EMBL

WWU MÜNSTER

Universität Konstanz

TECHNISCHE UNIVERSITÄT DRESDEN

LEIBNIZ-HKI

UNIVERSITÄT OSNABRÜCK

LIN LEIBNIZ-INSTITUT FÜR NEUROBIOLOGIE MAGDEBURG

UNI FREIBURG

German BioImaging
Gesellschaft für Mikroskopie und Bildanalyse

National Researchdata Infrastructure for BioImaging:
Implement national infrastructure and standards

nfdi

2017 2019 2021 2023

INDIVIDUAL PROJECT/GROUP INSTITUTIONAL NATIONAL INTERNATIONAL

Change management and continious improvements

RDM4mic

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adapted from Medyckyj-Scott, David et al. (2016). *Our Land and Water National Science Challenge - A Data Ecosystem for Land and Water Data to Achieve the Challenge Mission.*

https://german-bioimaging.github.io/RDM4mic.github.io/

RDM4mic

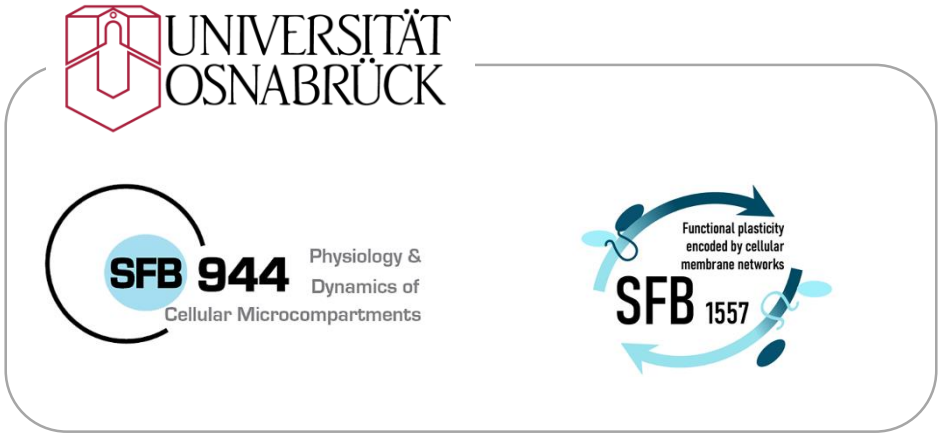
https://gerbi-gmb.de/i3dbio/i3dbio-about/

I3D:bio

https://nfdi4bioimage.de/en/start/

NFDI4BIOIMAGE

Acknowledgements



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German Research Foundation

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