Handling Data for the Ernst Ruska-Centre

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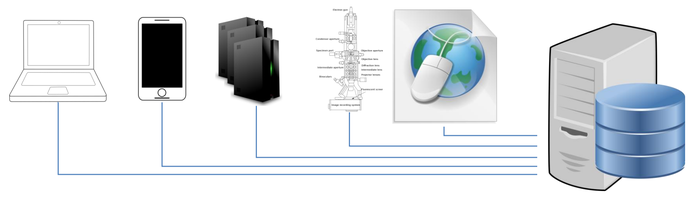
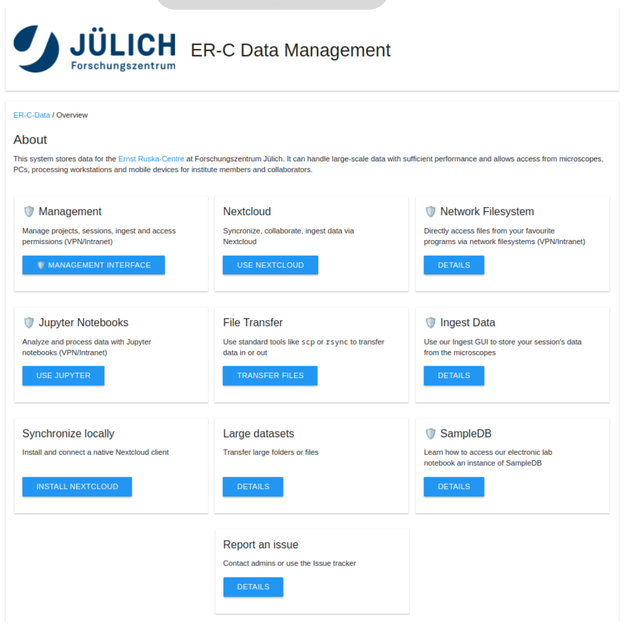
The Ernst Ruska-Centre (ER-C) for Microscopy and Spectroscopy with Electrons is a national user facility open to universities, research institutions and research laboratories in industry.

The ER-C is run conjointly by Forschungszentrum Jülich GmbH and RWTH Aachen University. The facility is located on the campus of Forschungszentrum Jülich GmbH, a major interdisciplinary research centre and member of the Helmholtz Association.



Landing page er-c-data.fz-juelich.de



Requirements

- Manage heterogeneous data for heterogeneous user base
  - From basic to expert IT skills
  - Different tools for different people
  - Mix and match as desired
- Modular, extensible, versatile, simple, familiar
  - Integrate parts managed by different teams
- Can be large-scale – 100s of GB per dataset
- Performant data access
- Culturally acceptable: Users manage their own data in electron microscopy
  - Empower users
  - All day-to-day actions without admin intervention
- Integration with microscope systems
  - Often some older versions of Windows
  - Limit changes to setup, network

Acquisition

- Absorb the data coming from the detector and store it somewhere
- Inspect data quickly during session
- Keep notes, meta-information linked to raw data files
- Transfer to permanent storage location

Storage

- File system or object storage?
  - Most software at ER-C uses POSIX-like file system
- Maintain authentication and authorization throughout the system
- Prevent data loss
- Performant access

Access

- Collaboration, sharing, exchange
- Selective access control
- Internal, external
- Mobile devices
- Services
- External storage media
- Gateway for transfers
- Keep connection to metadata

Processing

- Fast data access for shared workstations
- Computation close to data
- Sync & Share for PCs, laptops

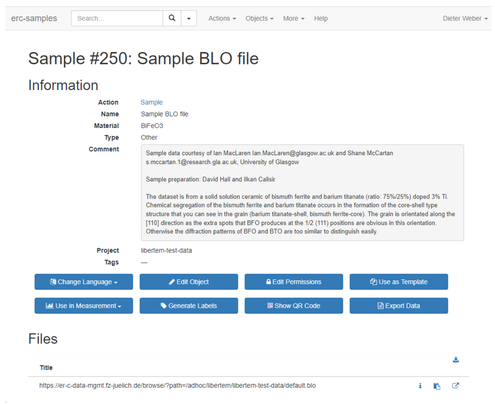
Publication

- Currently handled by users, external platforms
  - Zenodo
- Possible to set up public gateway

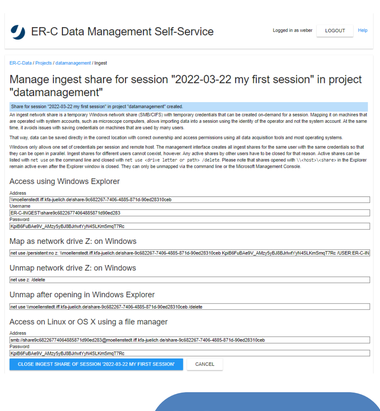
Archival

…future

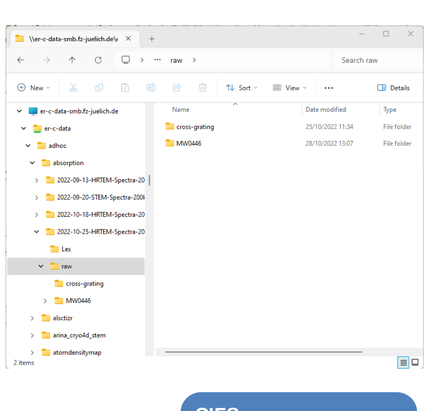
SampleDB: Details with reference to file



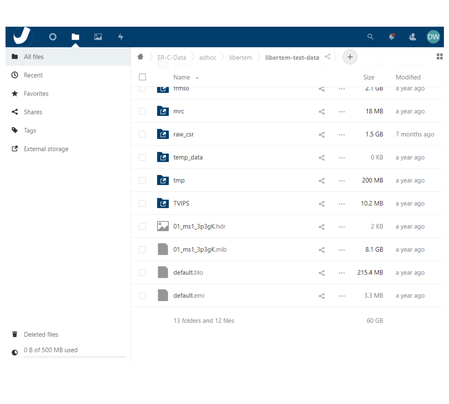
Management: Network share for ingest



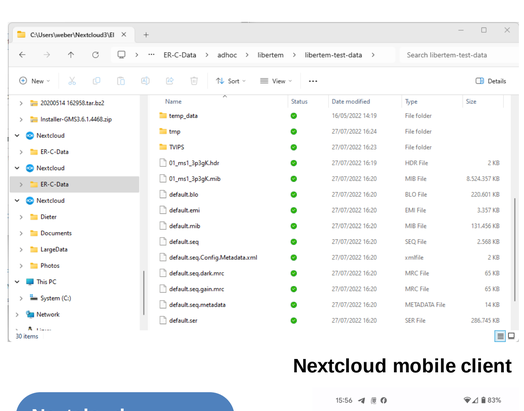
Windows network drive



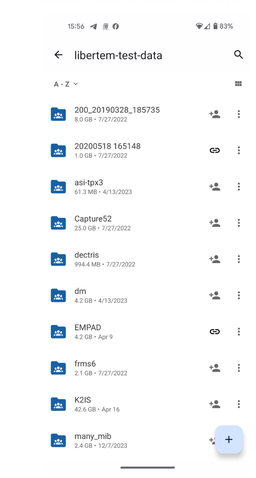
Nextcloud web interface



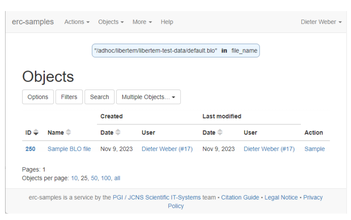
Nextcloud sync client



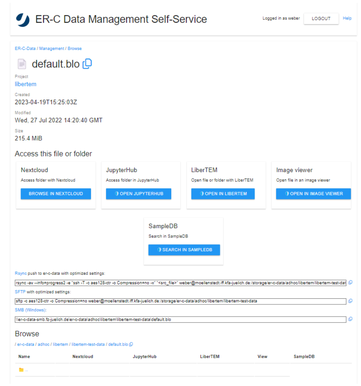
Nextcloud mobile client



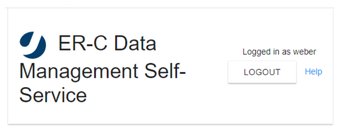
Search file references in SampleDB

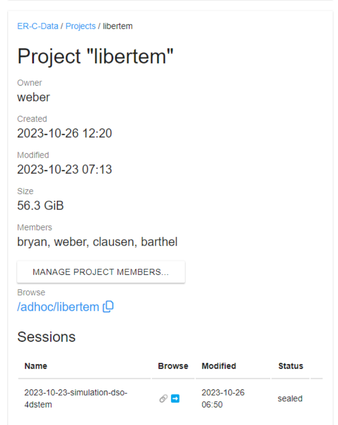


Web-based browsing, link platform



Management web interface





CIFS on shared systems

- Temporary accounts
- Reduce issues with cached credentials

CIFS

- Clients in fast local network

Nextcloud

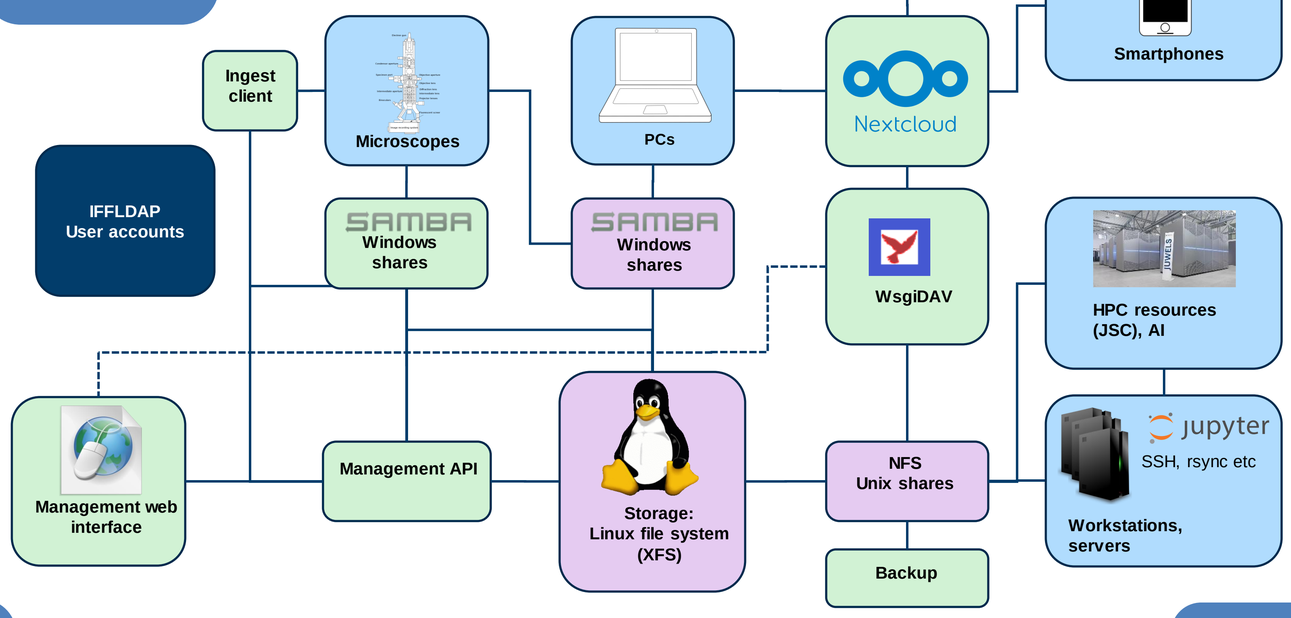
- Web interface
- Sync & Share
- Mobile client

Browse contents

- Link to services
- Target for backlinks
- Access methods

- ELN integration
- File inspection

IFFLDAP User accounts



Interface for complex operations and elevated permissions

- Create projects
- Manage members
- Make data immutable

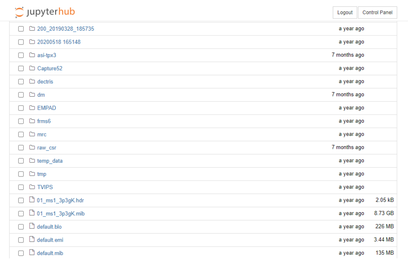
File system is source of truth for authorization

Groups based on ACLs

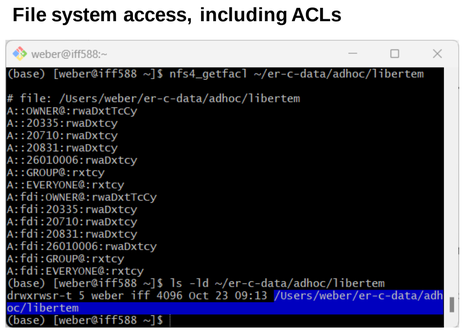
JupyterHub

Notebooks, plus launcher and proxy for web applications

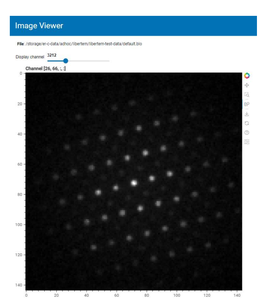
JupyterHub file browser



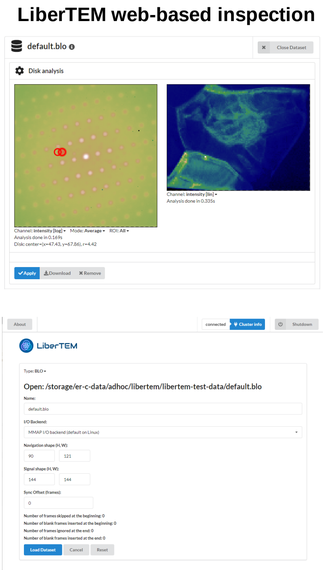
File system access, including ACLs



Web-based data viewer



LiberTEM web-based inspection



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Cooperation within framework of AIDAS