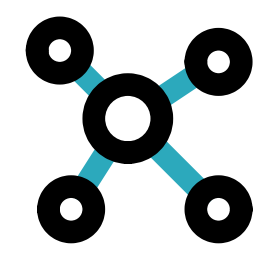


Distributed data management for large collaborative projects: DataLad ecosystem in Collaborative Research Center 1451

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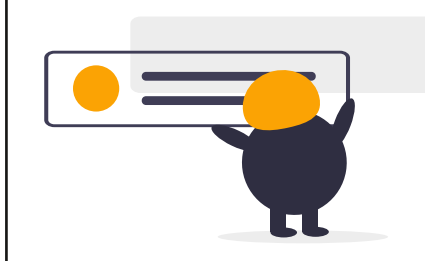
Collaborative Research Center

- Consortium-type funding by German Research Foundation (DFG)
- CRC1451: Key Mechanisms of Motor Control in Health and Disease
- 24 research groups: animal, human, clinical & cross-linking
- INF project goal: extend workflows to help foster a rich data collection for cross-species computational modelling
- Challenges: multi-site, no central storage storage, diverse data, heterogeneous workflows [1]
- Approach: distributed data management [2]

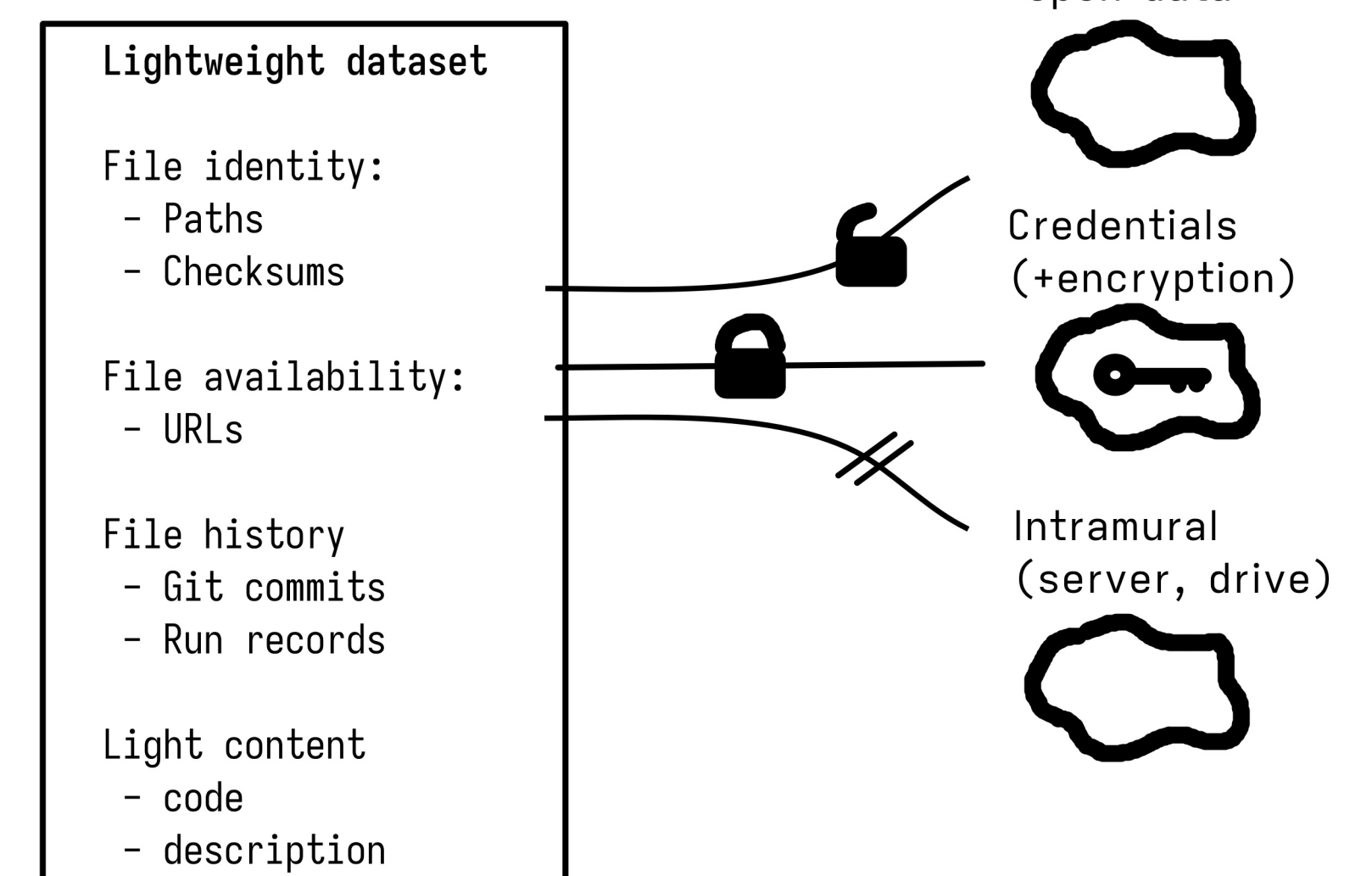


What is DataLad

- Free and open source distributed data management software [3]
- Built on top of Git and git-annex [4]
- Track file identity, availability, provenance
- Unified access to distributed data
- File identity and content are separated
- Optional git-annex encryption [5]
- Extensible through extension packages (extension-template)
- CRC: Findability, Accessibility, Interoperability, and Reusability of data is achieved with DataLad as an overlay structure; projects retain full control about applicable standards, data sharing
- Extensively documented: handbook.datalad.org

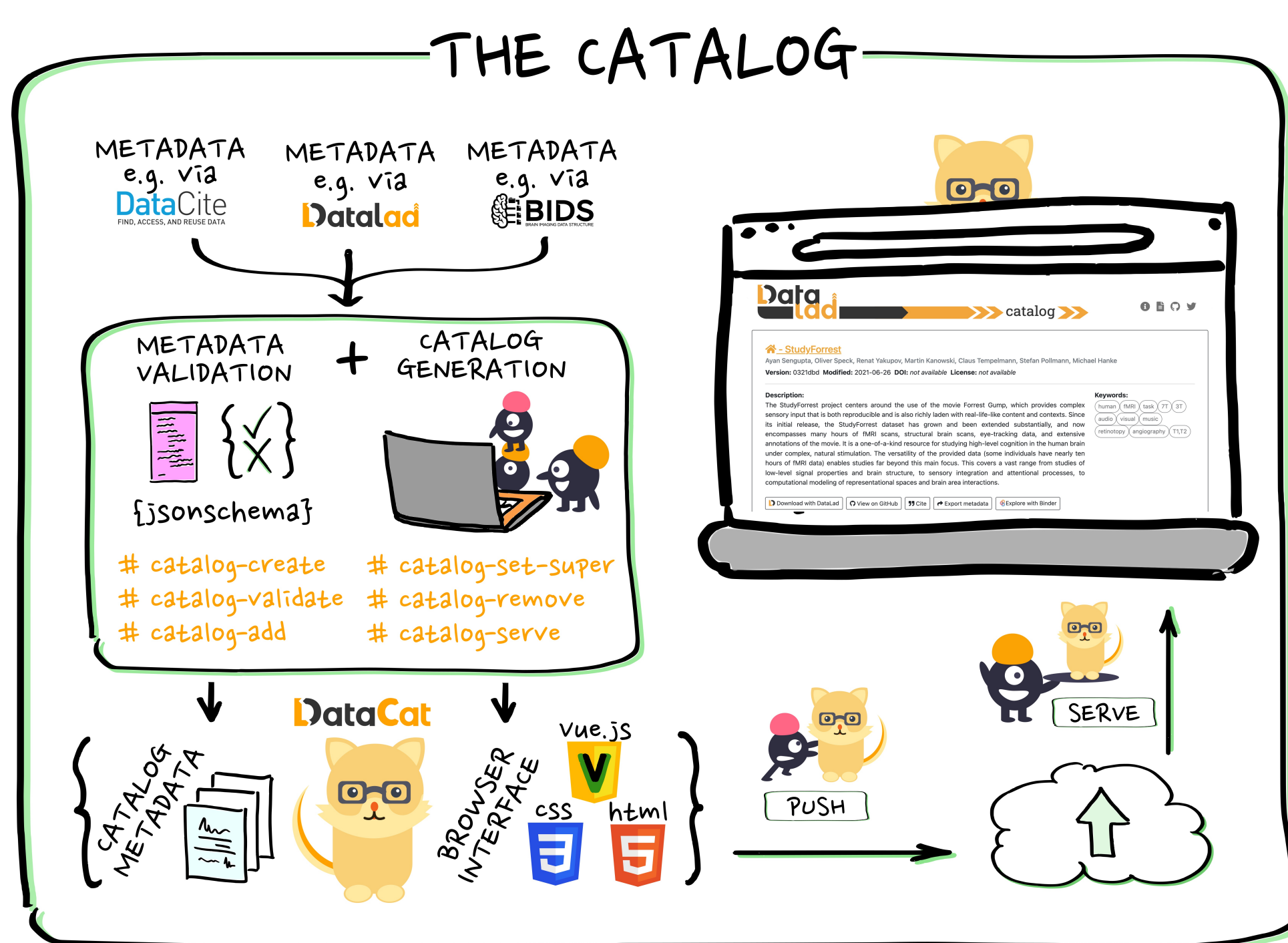


Tracking files at their location



DataLad Catalog

- Generate a user-friendly web catalog from structured metadata
- Catalog: data description, not data storage
- Content is generated and displayed as a website (HTML+JS)
- Can be actionable with DataLad
- CRC: data portal, entry point to datasets; preview at: psychoinformatics-de.github.io/sfb1451-projects-catalog
- <https://docs.datalad.org/projects/catalog/>



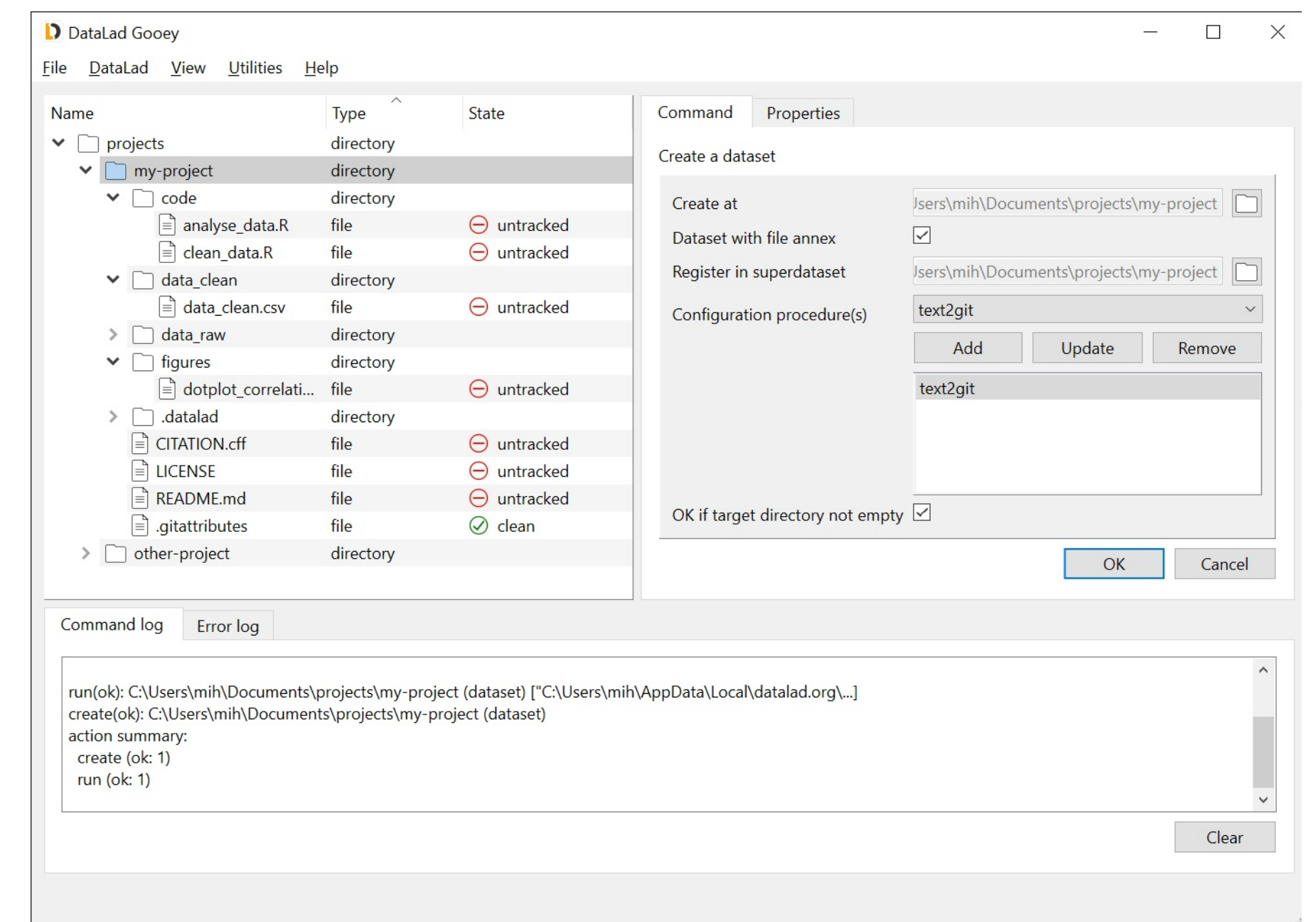
DataLad Tabby

- DataLad Tabby: tooling for tabular metadata, JSON-LD in disguise
- Format specification for describing datasets
- A list of files is equivalent to DataLad dataset without history (identity + location)
- Can be prepared in a spreadsheet
- Translates to JSON-LD, hides complexity away
- Can be used for catalog generation
- <https://docs.datalad.org/projects/tabby>



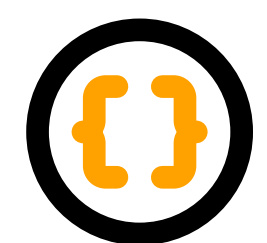
DataLad Gooley

- Graphical User Interface for DataLad
- Make key data management tasks more accessible and more convenient
- Companion, not competition for CLI
- <https://docs.datalad.org/projects/gooley>



DataLad Next

- DataLad next: broadly-applicable additional functionality
- UX improvements
- WebDAV interface: integrate cloud storage (e.g. Nextcloud) with DataLad workflows
- Export tree mode and Git remote helper: DataLad or point&click access to archived files
- URL operations for custom & credentialled http(s) and ssh access: more flexible storage and sharing
- <https://docs.datalad.org/projects/next>



DataLad MetaLad

- MetaLad: DataLad extension for semantic metadata handling
- Extraction, aggregation, filtering and reporting
- Extractor-based workflows (extractor: produces metadata)
- JSON (with defined outer structure) as metadata format
- CRC approach: capture immediately, curate perpetually
- <https://docs.datalad.org/projects/metallad>



Useful infrastructure

- G-node GIN: repository store with Git & git-annex support (large file content, DOI service) hosted by LMU Munich [6]
- Sciebo: Nextcloud-based regional academic cloud service (for North Rhine-Westphalia, Germany)



[1] Mittal et al. (2023), Data management strategy for a collaborative research center, <https://doi.org/10.1093/gigascience/giada049>

[2] Hanke et al. (2021), In defense of decentralized research data management, <https://doi.org/10.1515/nf-2020-0037>

[3] Halchenko et al. (2021), DataLad: distributed system for joint management of code, data, and their relationship, <https://doi.org/10.21105/joss.03262>

[4] <https://git-annex.branchable.com/>

[5] https://handbook.datalad.org/en/latest/usecases/encrypted_annex.html

[6] Kalantari et al (2023), How to establish and maintain a multimodal animal research dataset using DataLad, <https://doi.org/10.1038/s41597-023-02242-8>