



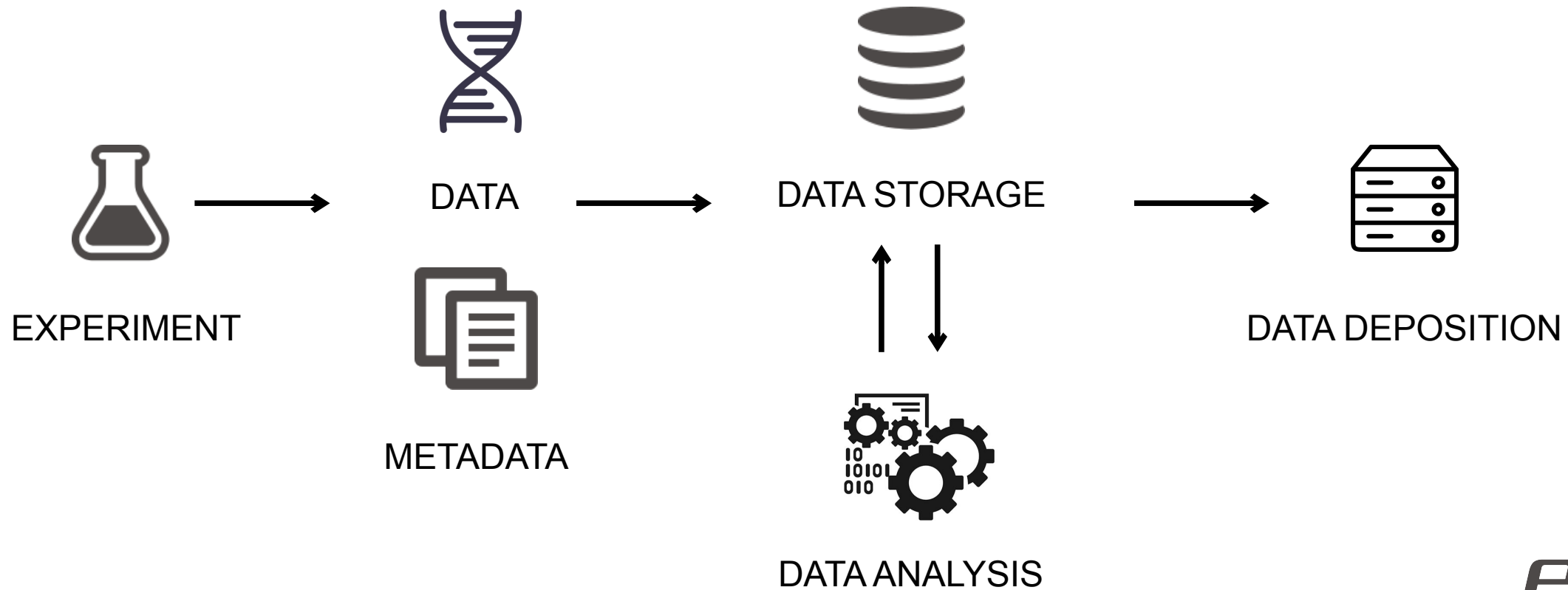
National storage infrastructures

NeLS/StoreBioInfo, NIRD, TSD

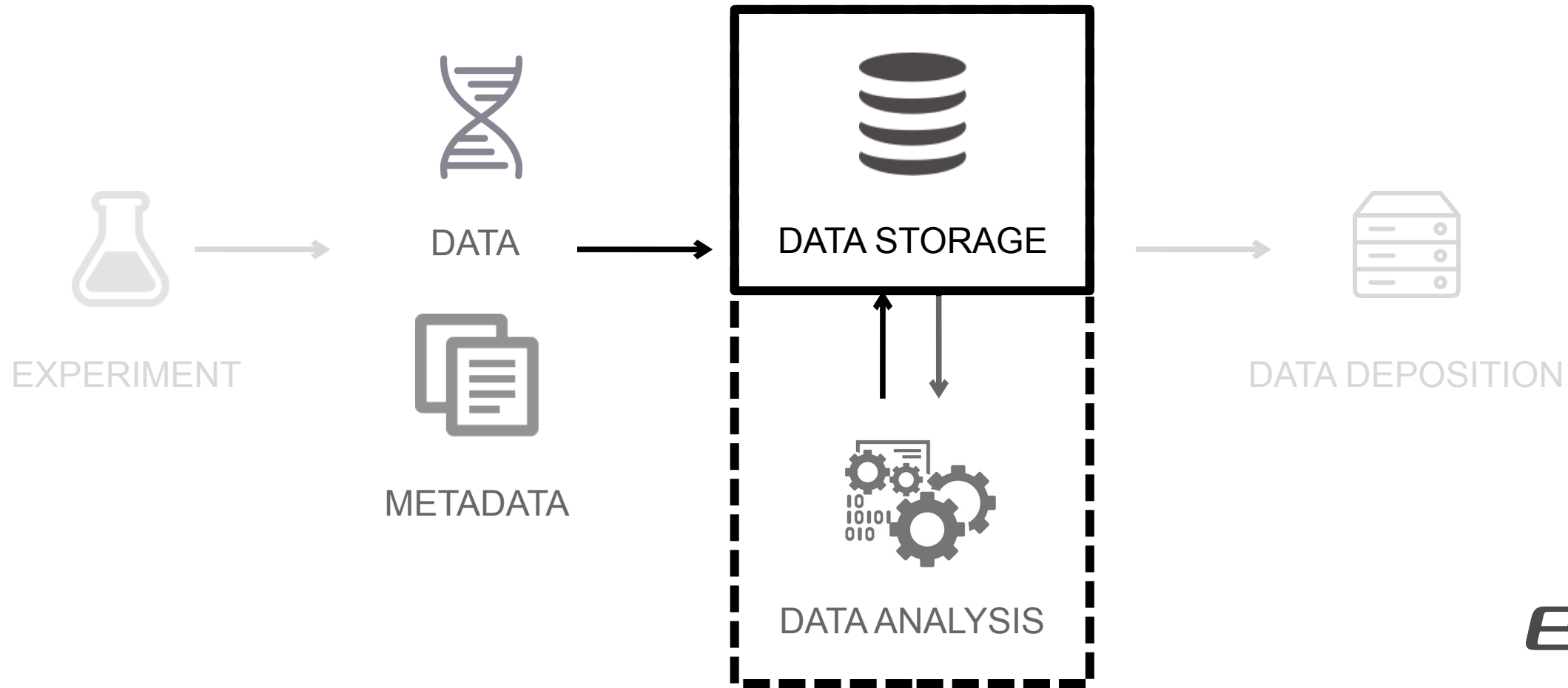


Erik Hjerde
ELIXIR Norway

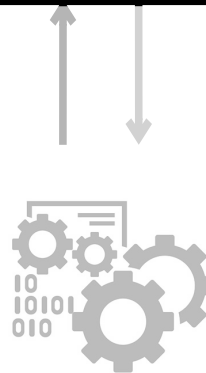
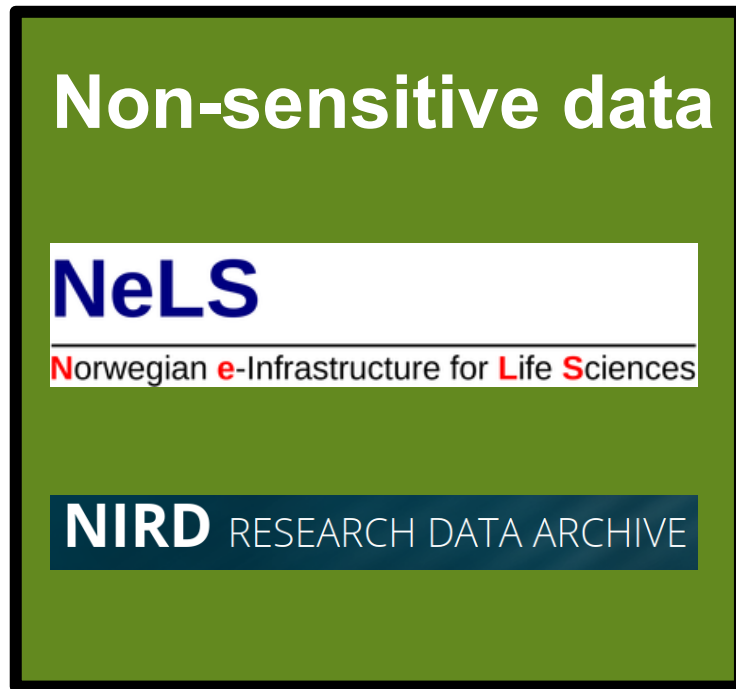
Data storage – from the researcher perspective



Data storage – from the researcher perspective



National storage infrastructures



DATA ANALYSIS



Data storage – General considerations

The ELIXIR Research Data Management kit

Data life cycle	+
Your role	+
Your domain	+
Your problem	-

Compliance monitoring

Data analysis

Data management plan

Data organisation

Data protection

Data publication

Data quality

Data storage

Data transfer

Identifiers

Licensing

Documentation and metadata

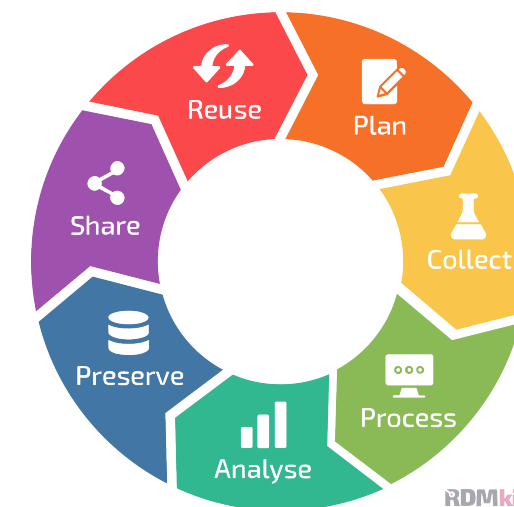
Sensitive data

All tools and resources

- What features do you need in a storage solution when collecting data?
- How do you estimate computational resources for data processing and analysis?
- Where should you store the data after the end of the project?
- Relevant tools and resources

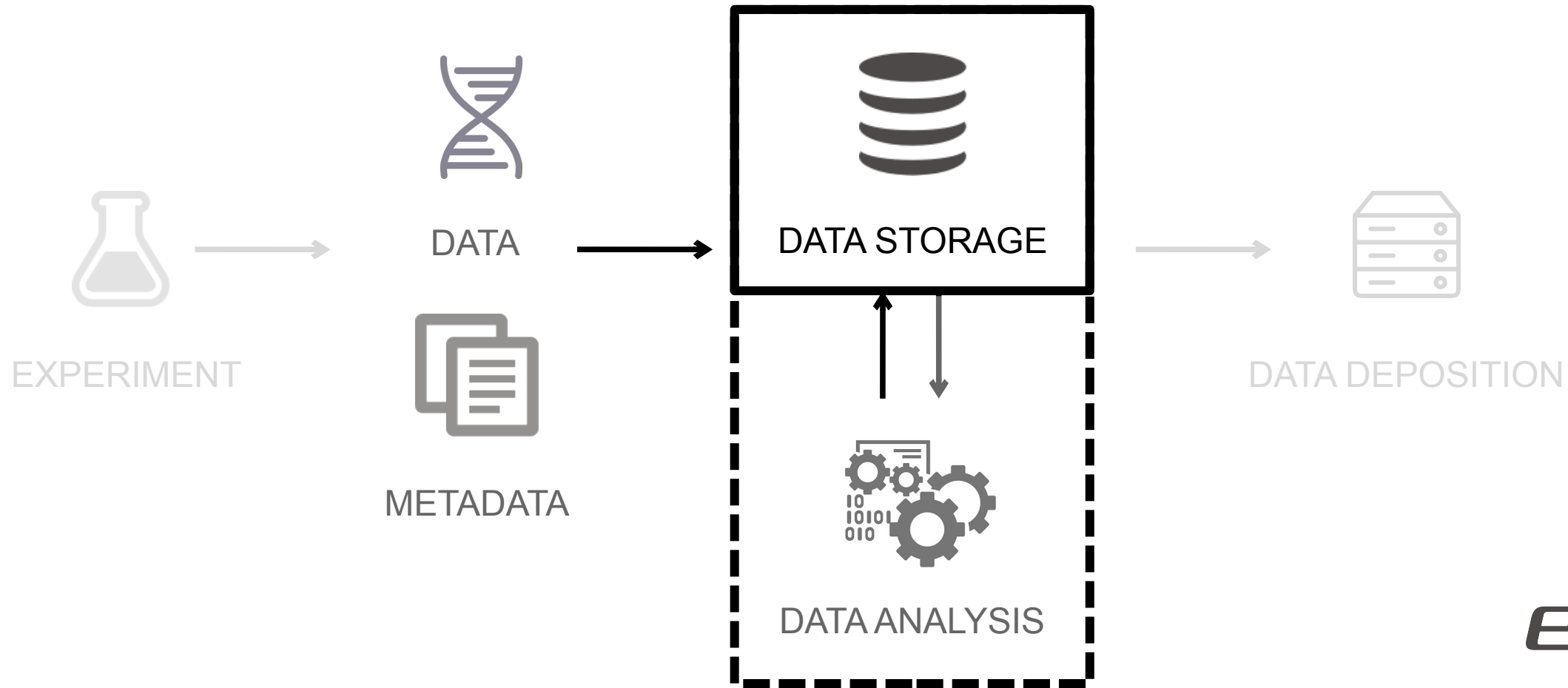
Relevant tools and resources

Tool or resource ⓘ	Description	Tags	Registry
CERNBox	CERNBox cloud data storage, sharing and synchronization	storage	
CS3	Cloud Storage Services for Synchronization and Sharing (CS3)	storage	
DATAVERSE	Open source research data repository software.	storage researcher data manager IT support	



Link to RDMkit storage: <https://rdmkit.elixir-europe.org/>

Data storage – from the researcher perspective

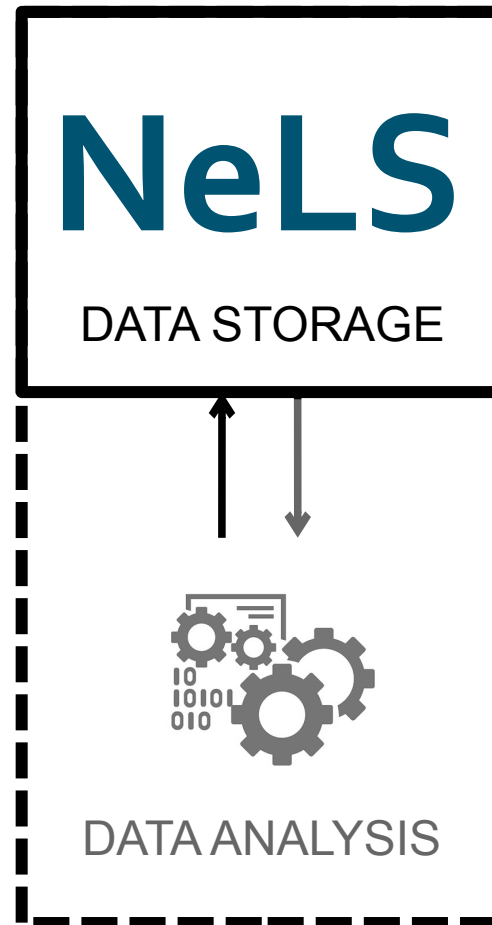


Data storage in NeLS and StoreBioInfo (SBI)

Norwegian e-infrastructure for Life Sciences - developed and operated by Elixir Norway

NeLS in general

- Available to all Norwegian researchers
- Enable collaborative projects
- Multiple storage layers
- Integrated with compute
- Multiple permission roles - shared data
- Free of charge*
- Support for data deposition
- User support: Elixir Norway helpdesk



Type of data

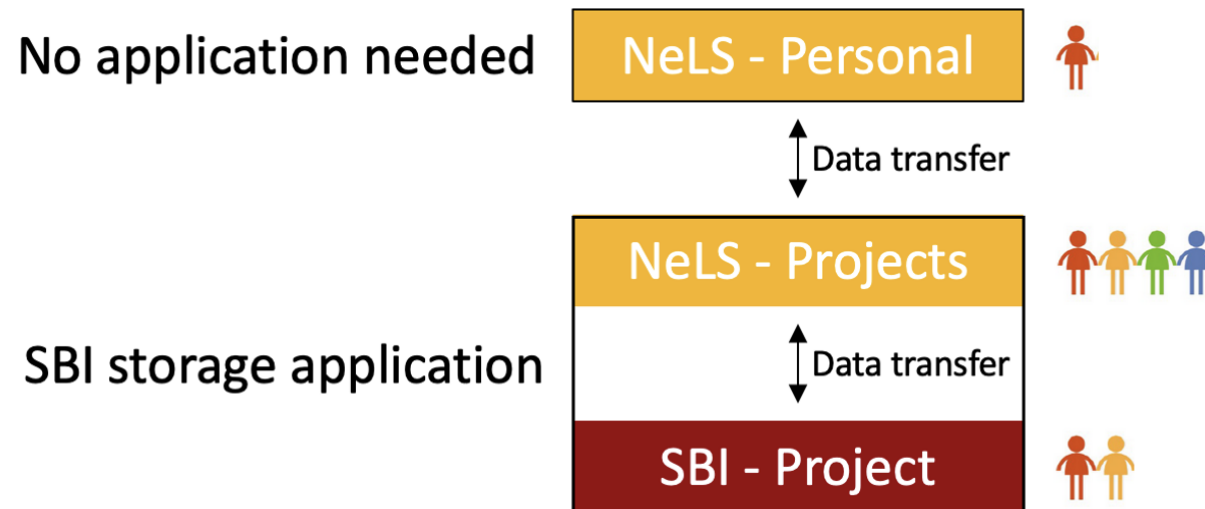
- Non-sensitive data
- Support multiple data types
- SEEK integration for metadata

Data storage in NeLS/SBI – How to get access

Storage application needed for projects where data is shared by many users

Access via FEIDE user or NeLS idp can be made for non-FEIDE users

Free storage < 10 TB



Apply for storage: contact@bioinfo.no

Wiki for usage: <https://nels-docs.readthedocs.io/en/latest/>

Access data storage in NeLS

The NeLS portal can be accessed via a web browser at <https://nels.bioinfo.no/> or via a file transfer tool (e.g. Filezilla) or the command line SCP

The image displays three overlapping screenshots of the NeLS portal interface, illustrating different sections of the user dashboard.

Top Screenshot (Dashboard): Shows the NeLS Disk Usage graph, which plots storage usage over time from September 2016 to May 2018. The usage is relatively stable, fluctuating between approximately 74.5 GB and 93.1 GB. Below the graph is the Account Information section, which lists the user's details: Full Name (Erik Hjerde), Email (erik.hjerde@uit.no), and Affiliation (University of Tromsø).

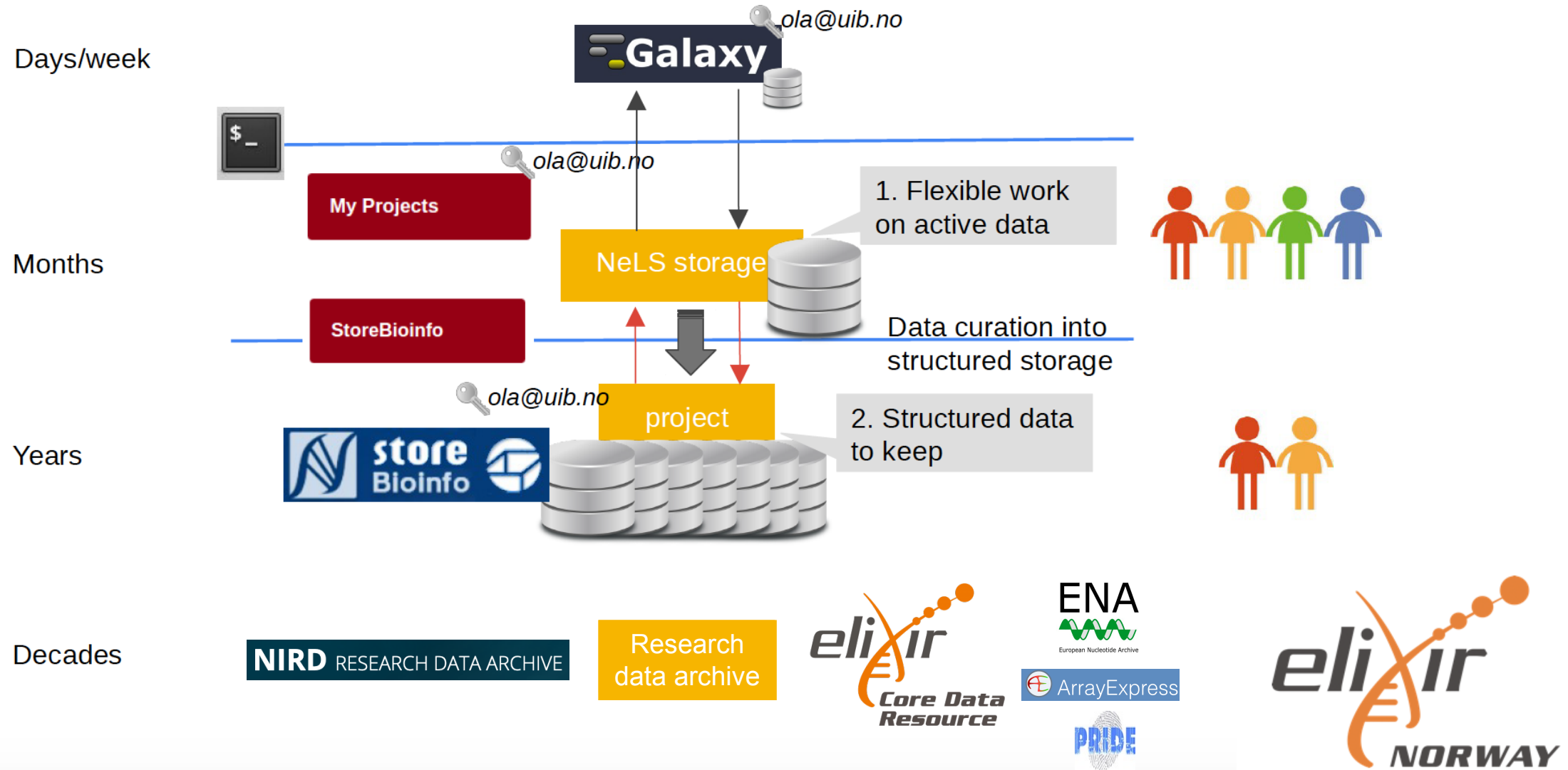
Middle Screenshot (My Data): Shows the 'My Data' section, which lists the user's personal data. The list includes folders such as Bio3323, ELIXIR2-WP4, Matt, metagenome, and Test2014. The interface also provides options to Upload, New Folder, Copy, Cut, Paste, Delete Selected, and Clear.

Bottom Screenshot (Projects): Shows the 'Projects' section, which lists the user's projects. The table below summarizes the projects:

Project Name	Role in Project	Creation Date
Elixir_NO-Documents A project for sharing Elixir.no related documents	Member Add files & folders, Navigate & Download	November 28, 2014
Uio-Test-Project for demo	Member Add files & folders, Navigate & Download	March 19, 2015
UIO_Halvorsen_RNAseq_Mouse_Spleen_T_cells_2018 RT#13277. Aim: To compare transcriptome of spleen T cells from WT mice and a transgenic mouse model.	Power User Manage File system: Add, Rename, Navigate, Download, Delete all Content	February 22, 2018
Elixir_workshops Folder holding materials/data for Elixir workshops	Member Add files & folders, Navigate & Download	April 15, 2016
UIB-Petersen_neuro_ma_regulation_disorder_2017 This is part of a larger consortium project, we are providing neuro samples RNA data (RNA-seq), for 100 cell lines cultivated in our lab at University of Bergen.	Power User Manage File system: Add, Rename, Navigate, Download, Delete all Content	May 11, 2017
maseq-test-data Data, 12 samples, two groups, for testing updated maseq-pipeline	Power User Manage File system: Add, Rename, Navigate, Download, Delete all Content	September 11, 2017
ELIXIR2-WP4 Collection of course data and documents	Power User Manage File system: Add, Rename, Navigate, Download, Delete all Content	November 8, 2017

On the right side of the bottom screenshot, the 'Data Operations' section displays a list of recent data operations, including successful uploads and downloads, with status, submitted time, and completion percentage.

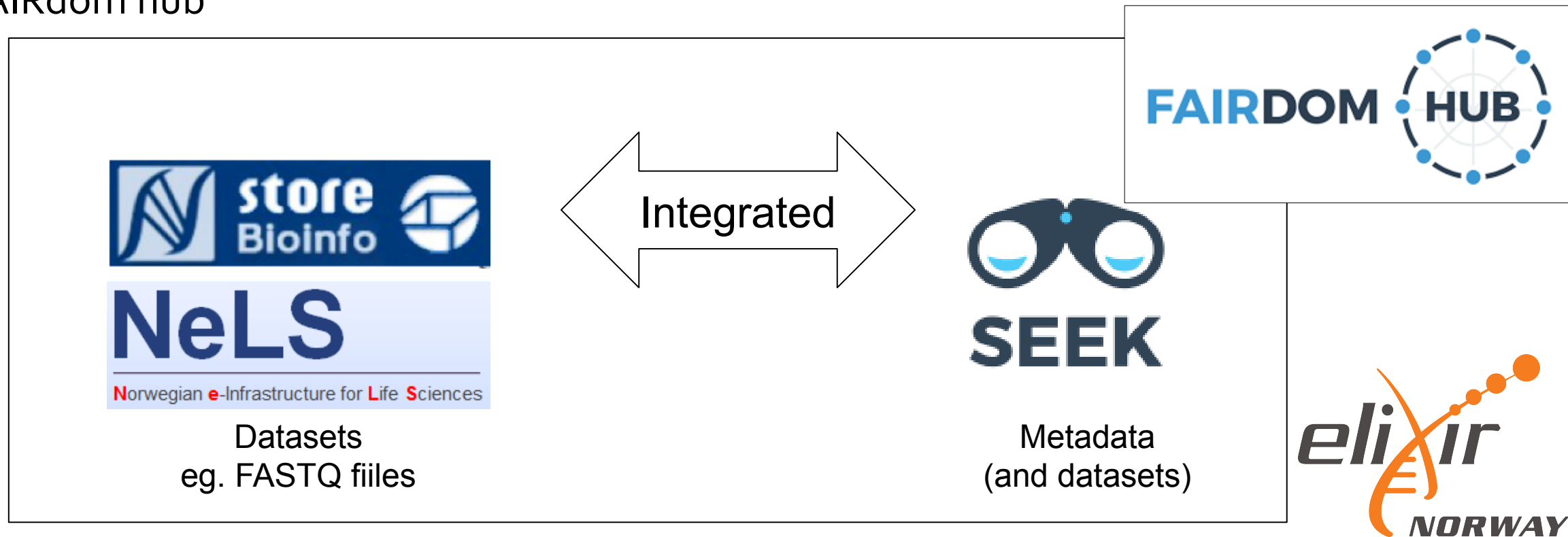
NeLS architecture



SEEK - sharing heterogeneous scientific research datasets, models or simulations, processes and research outcomes

The SEEK platform is a web-based tool for organising and storing data, and for exploring and annotating data

Norwegian users can link datasets stored in NeLS to a SEEK project using FAIRdom hub



Data storage in NIRD

National e-Infrastructure for Research Data - owned and operated by UNINETT Sigma2

NIRD in general

Available to all users with account

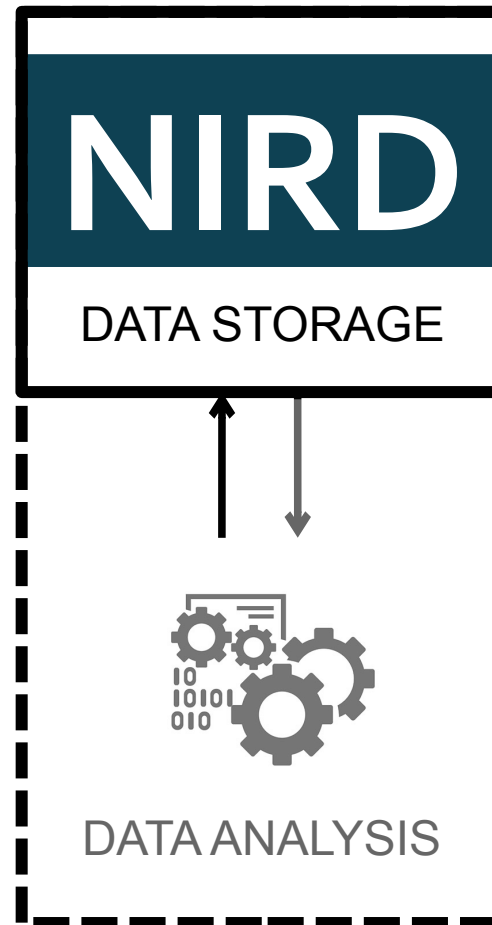
Enable collaborative projects

Integrated with compute

Multiple permission roles - shared data

Free of charge*

User support: Metacenter support



Type of data

Non-sensitive data

Support multiple data types

All type of scientific data*

Data storage in NIRD – How to get access

Apply for a UNINETT SIGMA2 user

Apply for a storage quota - Free storage < 10 TB

Four price categories

The model introduces four different categories of contributors.

- Category A
Large projects with funding from the Norwegian Research Council of 15 MNOK or more or storage needs above 10 TiB, paying for operational expenses
- Category B
Non-commercial projects needing Dedicated Resources, paying for capital and operational expenses
- Category C
Commercial research and industry which will pay the full cost price
- Category 0
Non-contributing projects which are smaller projects not in any of the above categories

Apply for user account: <https://www.metacenter.no/user/application/>

Apply for storage: <https://www.sigma2.no/apply-e-infrastructure-resources>

Wiki for usage: <https://documentation.sigma2.no/index.html>

Contribution model: <https://www.sigma2.no/user-contribution-model>

The process explained

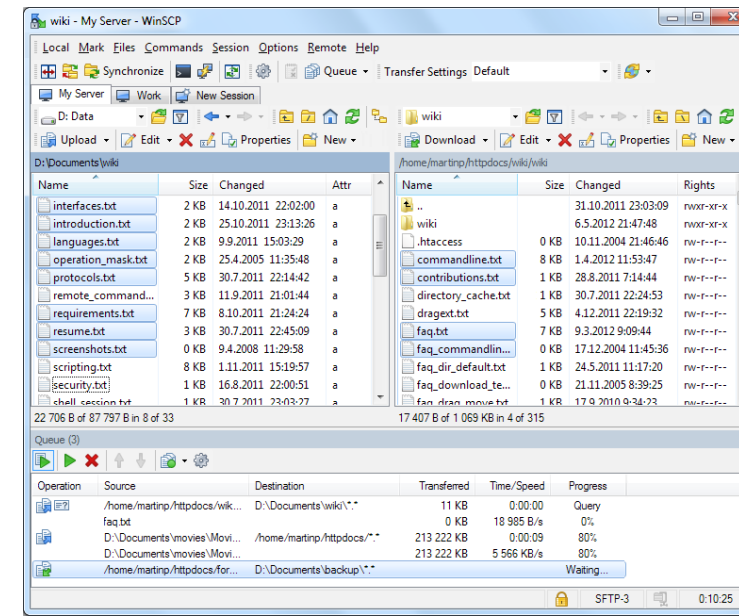
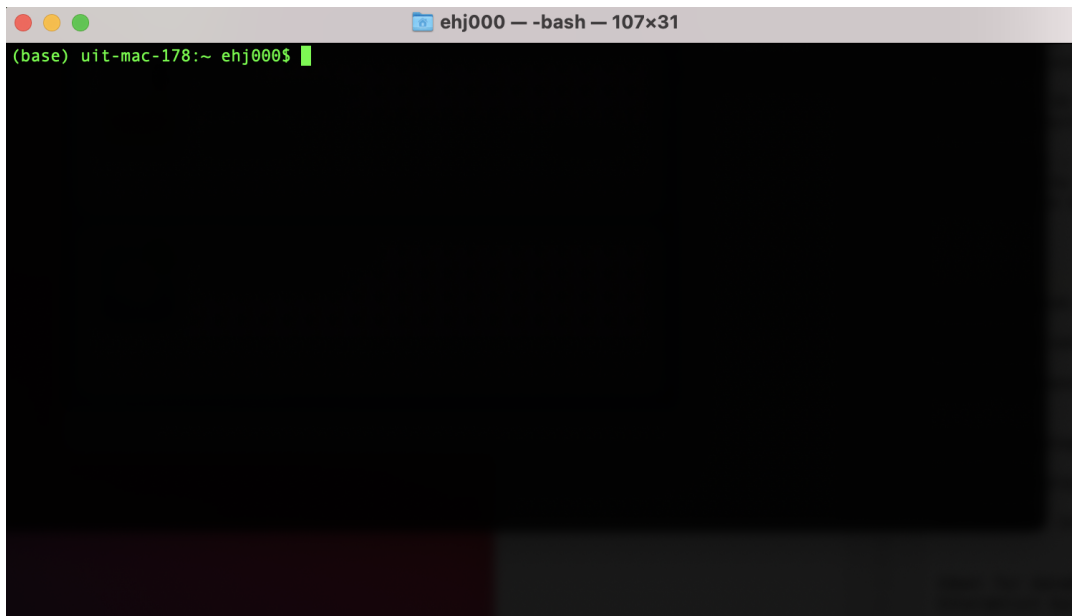
- 1 Submit user application
- 2 Signature by project management
- 3 Review by Sigma2
- 4 Set a password and log in



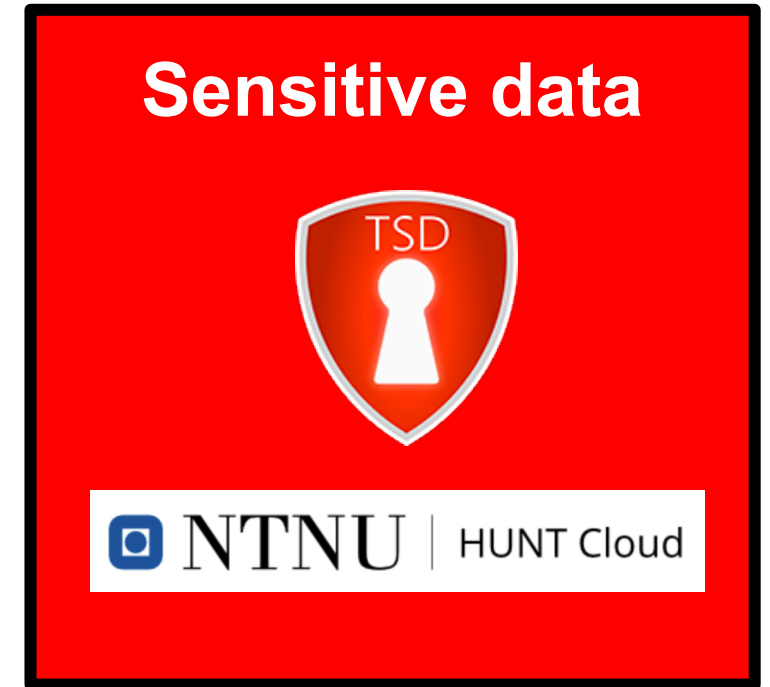
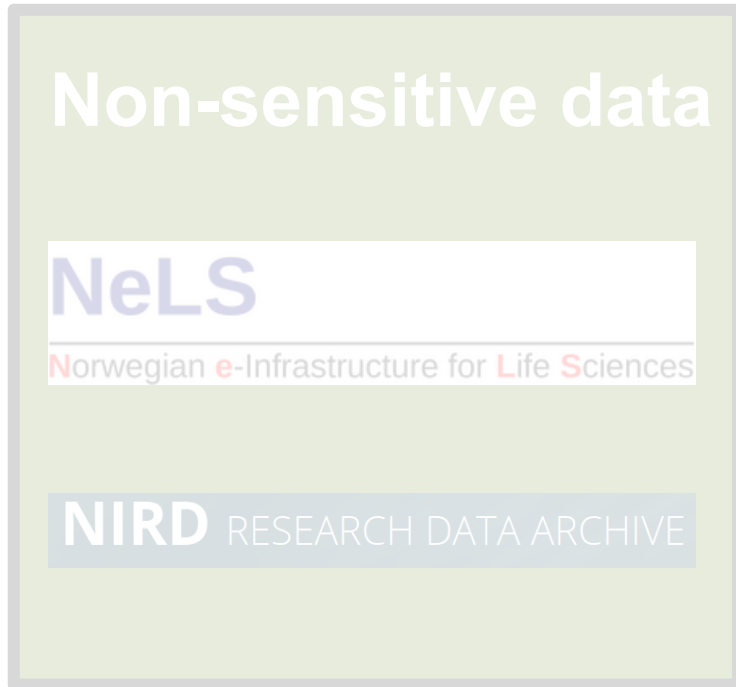
Access data storage in NIRD

The NIRD storage can be accessed via the command line using SSH

Data import/export via command line tools such as SCP or SFTP or other file transfer tools (e.g. WinSCP)



Sensitive data storage



Data storage in TSD

National service for sensitive data - developed and operated by UiO

TSD in general

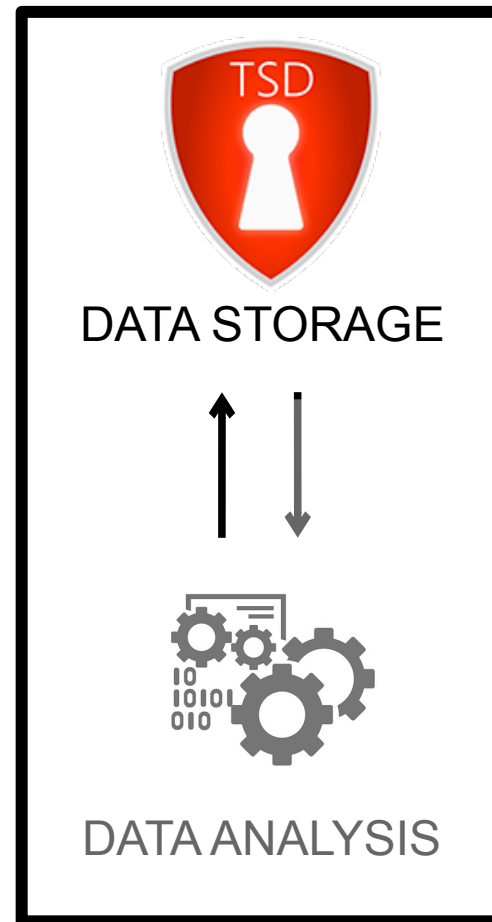
Available to all users with account

Enable collaborative projects

Integrated with compute

Multiple permission roles - shared data

User support: Tech and admin support



Type of data

Sensitive data

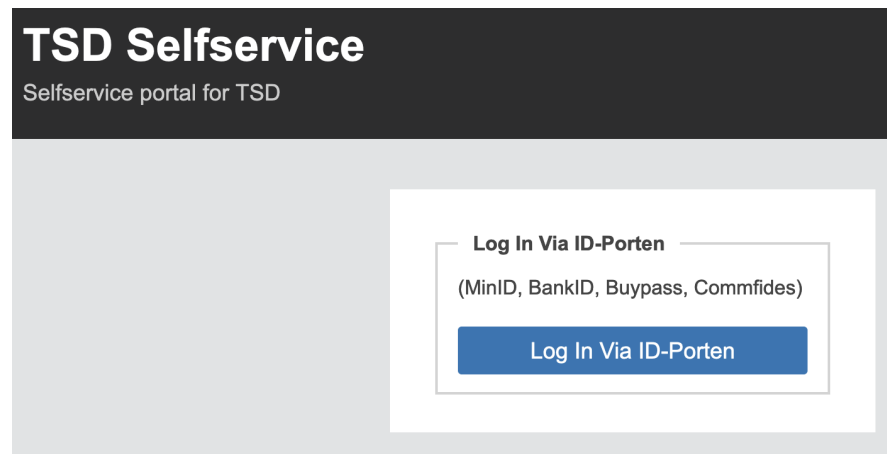
Support multiple data types

Data storage in TSD – How to get access

Apply for a project – need to document ethical approval (e.g. from REC)

Generate a TSD user – require 2-factor authentication

Payment models for storage



Apply for a TSD project through ELIXIR.NO:
ELIXIR Norway has a quota in TSD that, and
users can get subsidised quota through
ELIXIR in TSD

Generate user account: <https://selfservice.tsd.usit.no/>

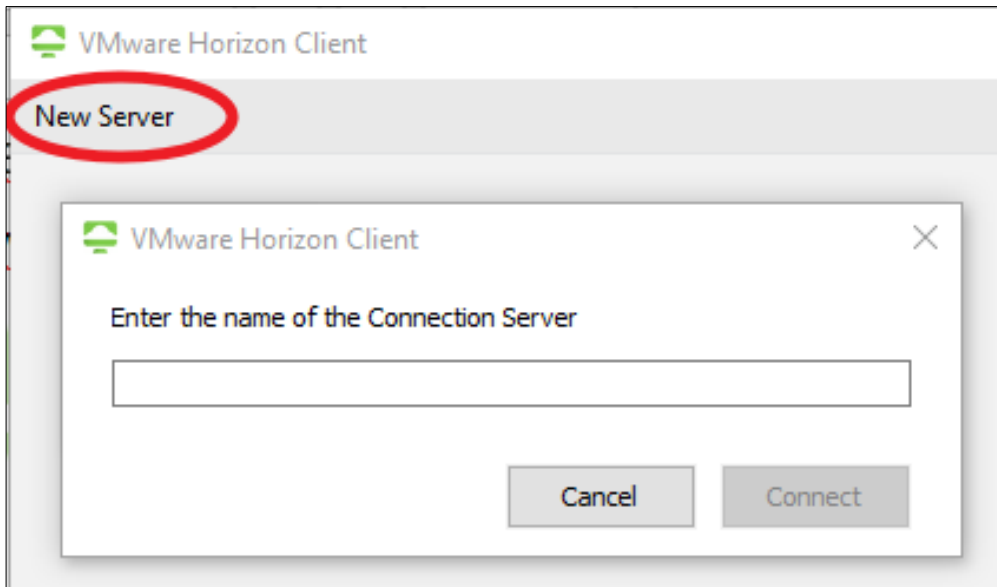
Apply for project: <https://www.uio.no/tjenester/it/forskning/sensitiv/hjelp/start/registrer.html>

Wiki for usage: <https://www.uio.no/tjenester/it/forskning/sensitiv/hjelp/start/index.html>

Access to data storage in TSD

The TSD storage can be accessed via VMware Horizon + 2-factor authentication

Import/export data via the web file upload service



TSD Data Portal

Welcome to the TSD Data Portal

To use this service you should already hold a valid TSD user account.



Import Files



Export Files

Where should I store and share my life science data?

	Sensitive data	Direct transfer from data producer	Web portal access*	Command line access	Shared projects	Integration for metadata	Support for data deposition	Free of charge
NeLS/SBI	✗	✓	✓	✓	✓	✓	✓	✓
NIRD	✗	✓	✗	✓	✓	✗	✗	✓
TSD	✓	✓	✗	✓	✓	✗	✗	✗

*Direct access to the data and project management through the web browser

Example - Data flow/handle using ELIXIR Norway

