



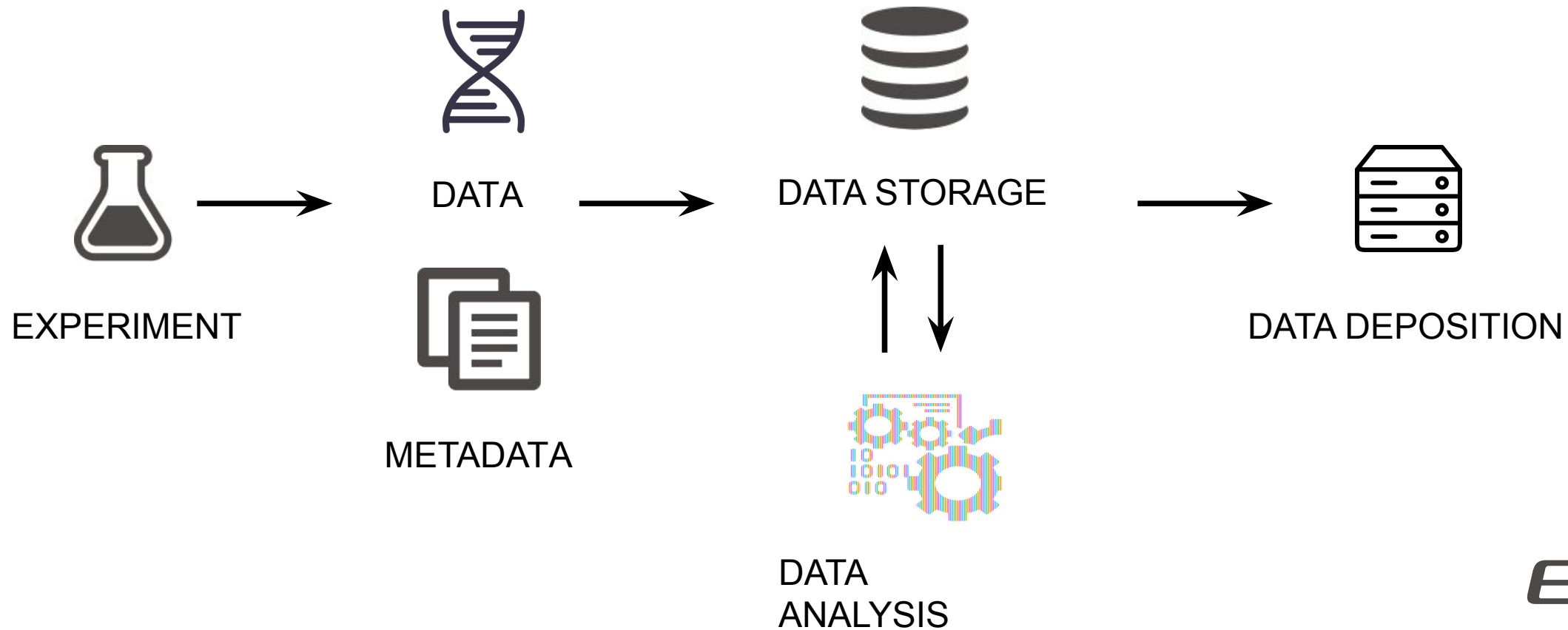
National storage infrastructures

NeLS/StoreBioInfo, NIRD, TSD

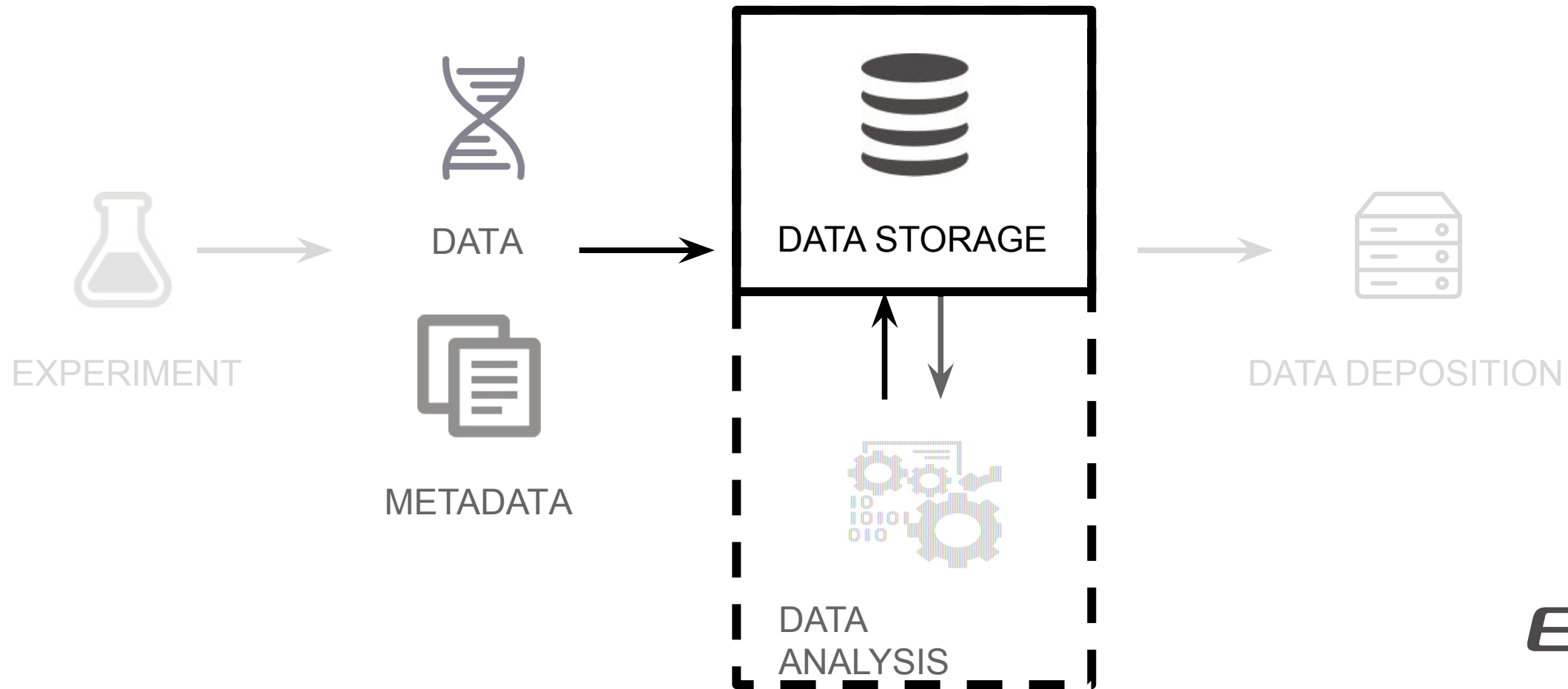


David Dolan
Research Support Lead
ELIXIR Norway

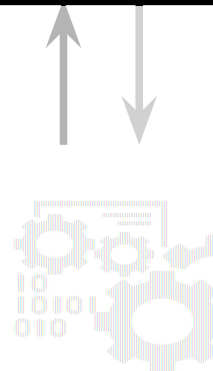
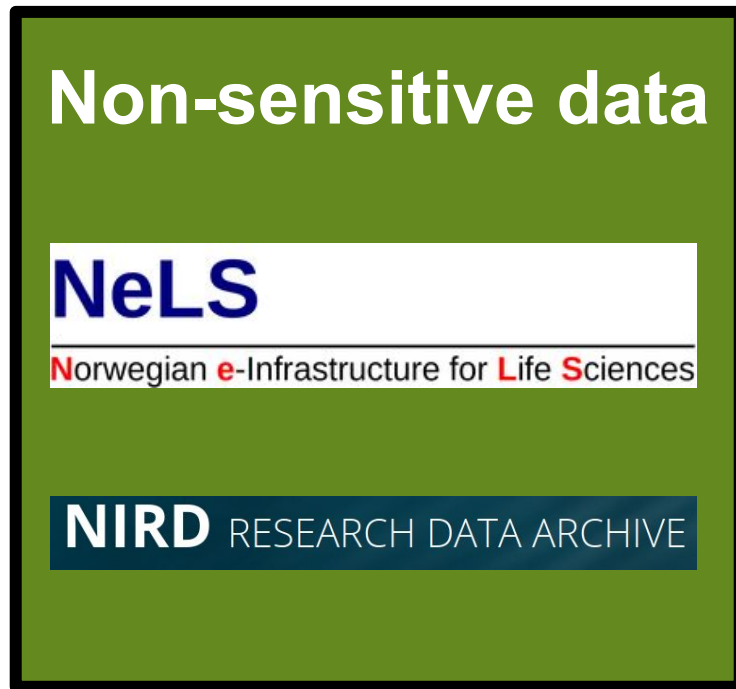
Data storage – from the researcher perspective



Data storage – from the researcher perspective



National storage infrastructures



DATA
ANALYSIS



Data storage – General considerations

The ELIXIR Research Data Management kit

Data management

Data life cycle ▼

Your role ▼

Your domain ▼

Your tasks ▲

Compliance
monitoring

Costs of data
management

Data quality

Data storage

Data transfer

Documentation and
metadata

Your tasks



Data storage

What features do you need in a storage solution when collecting data?

Description

The need for Data storage arises early on in a research project, as space will be required to put your data when starting collection or generation. Therefore, it is a good practice to think about storage solutions during the data management planning phase, and request storage in advance and/or pay for it.

Tools and resources on this page

Tool or resource	Description	Related pages	Registry 
Box	Cloud storage and file sharing service	Data transfer	 Training
CERNBox	CERNBox cloud data storage, sharing and synchronization		
CS3	Cloud Storage Services for Synchronization and Sharing (CS3)		

On this page

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?

[Related pages](#)

[More information](#)



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



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

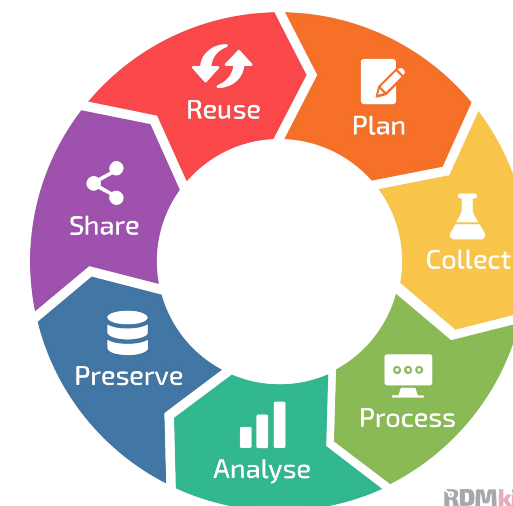
Sensitive data

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

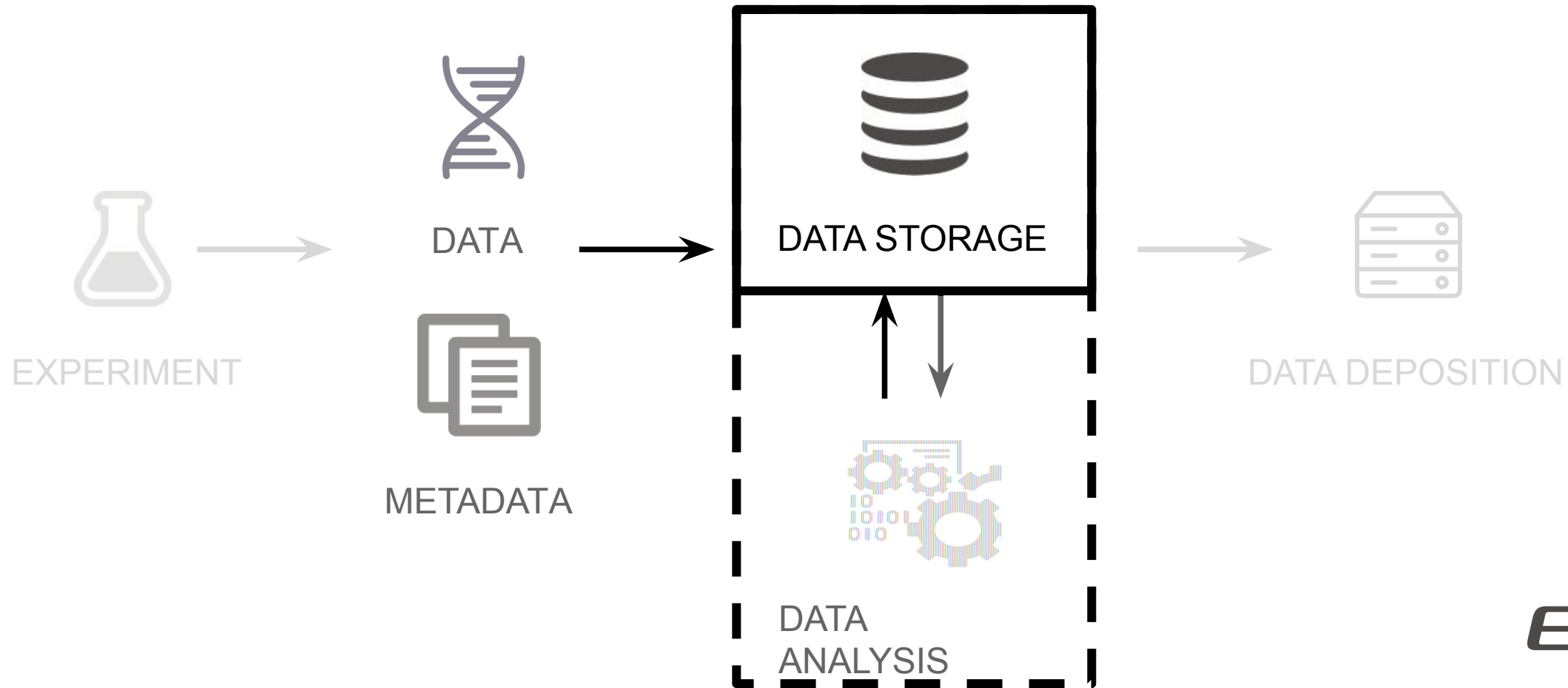
Relevant tools and resources

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: <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

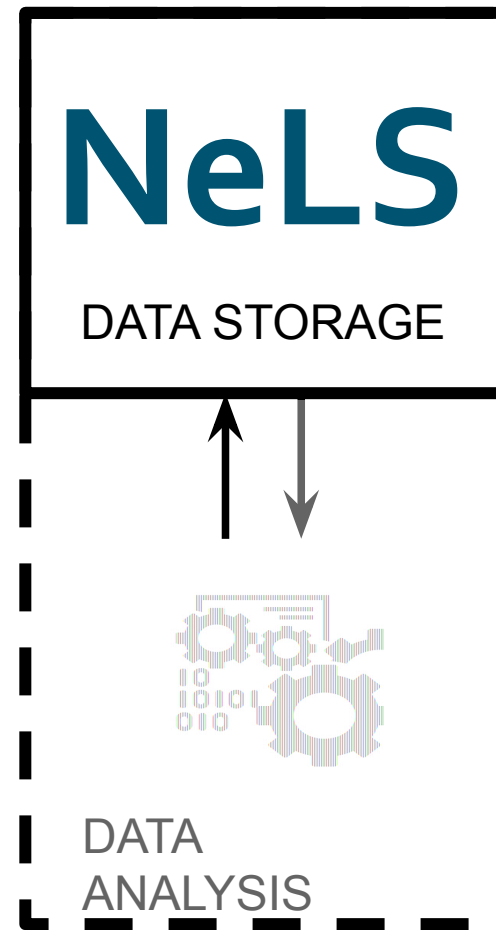
Integrated with compute

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

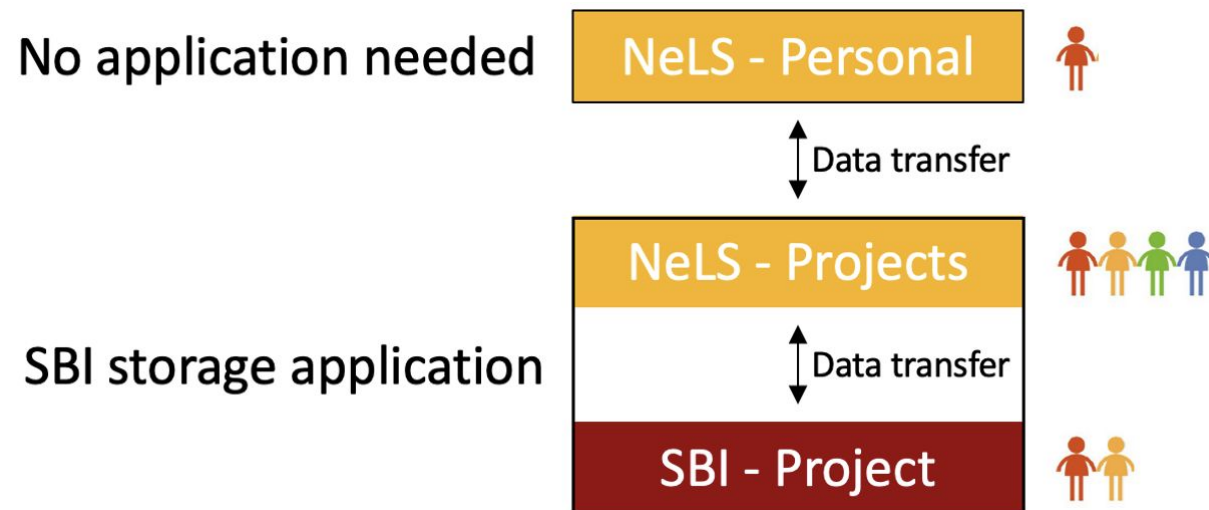
SEEK integration for metadata

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: support@elixir.no

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

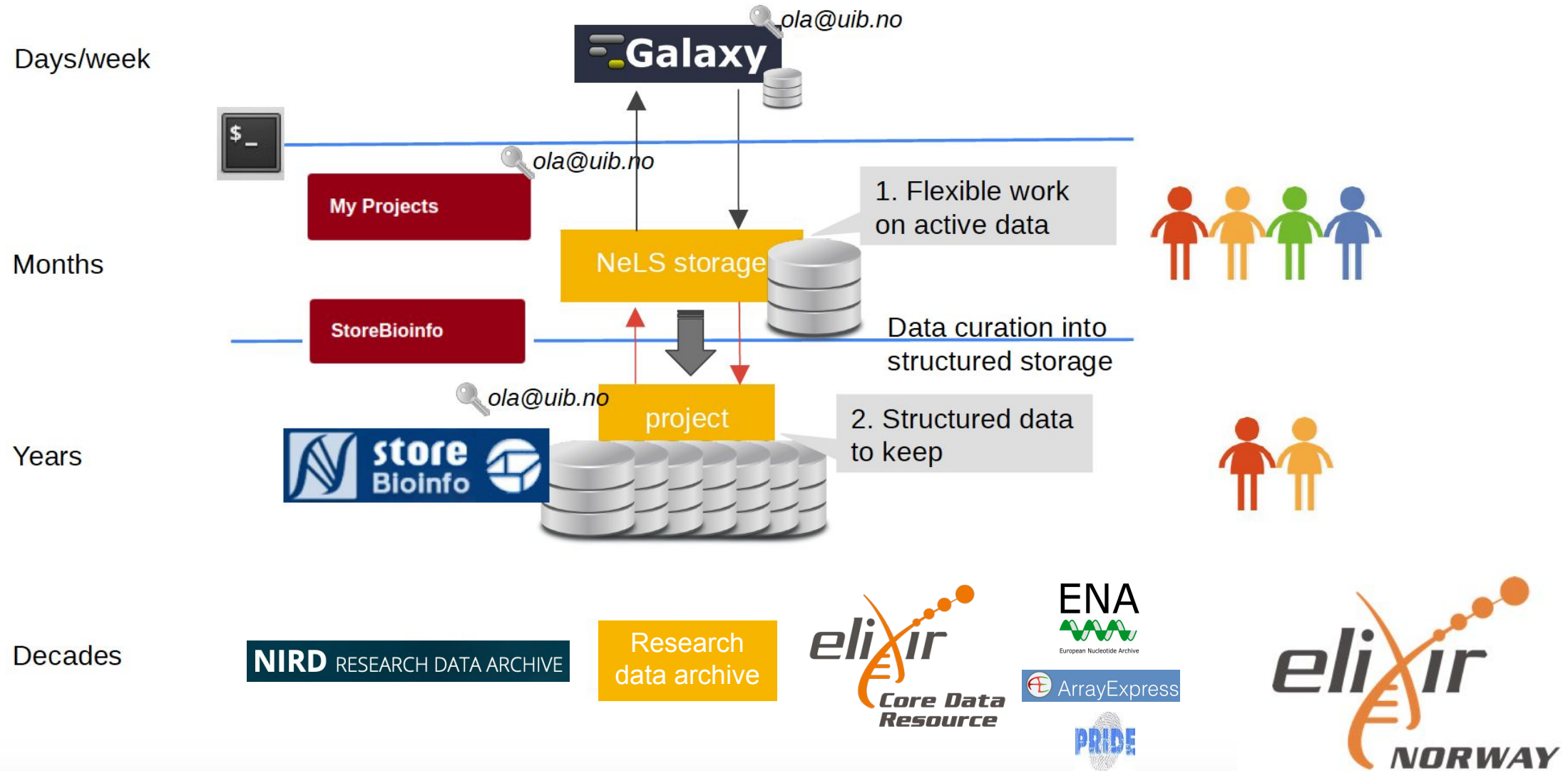
Access data storage in NeLS

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 screenshot displays the NeLS portal interface. On the left is a sidebar with navigation links: Home, NeLS Personal, NeLS Projects, StoreBioinfo, Help & support, Terms of Usage, External links (ELIXIR Norway, ELIXIR Norway Wiki, Galaxy Norway), My Profile, and Logout. The main content area is divided into three panels. The top panel shows 'Notifications' with a list of updates. The middle panel shows 'Disk Usage' with a file browser. The bottom panel shows 'Projects' with a table of project entries.

Project Name	Rule	Creation Date		
UBR_Grellscheid_RCP-Seq_Human_Senescence_Ageing_2023				
We have employed ribosome complex profiling (RCP-Seq) to gain insights into translational changes in ageing using DNA-damage induced senescence in cultured human cells (E205) as a model. The dataset comprises NGS data of total RNA and of the 40S and 60S ribosome footprints from proliferating and senescent cells. RT#5291230			Helpdesk	Jul 7, 2023
UBR_Harris_RNAseq_Mouse_Fibroblast_Raw_2023				
High mobility group box 1 (HMGB1) is a multifunctional protein and plays important roles in inflammation in addition to general cell processes. Following HMGB1 knockout, mouse fibroblasts show considerable changes in key cellular processes. The assessment of changes in gene expression in HMGB1 knockout cells may therefore further elaborate on the function of HMGB1. Further HMGB1 is a prototypical DAMP that is composed of three domains that can undergo posttranslational modification. Different variants of extracellular HMGB1 have been shown to different other contrasting effects on cells. Assessment of gene expression on RAW cells following stimulation of HMGB1 variant will provide further information as to HMGB1 extracellular functions. RT#5580538			Core Facility	Jun 30, 2023
UBR_Kalland_154c107_LiCAP_DJ145_cells_2023				
The compounds investigated are cisplatin chemical derivatives. Preliminary results suggest growth inhibitory effects on prostate cancer cell lines and possible effects on STAT3 and androgenreceptor (AR) pathways. The aim is to explore effects on AR target genes and potential other gene expression modules in LiCAP and DJ145 cells in this dataset.			Helpdesk	Jun 27, 2023
UBR_Myrak_RNAseq_Human_Primary_Endothelium_2023				
Chronic kidney disease dramatically increases cardiovascular risk of the individual. That is partially attributed to an increase in the serum concentration of toxic metabolites, among which is urea. High concentrations of urea lead to protein modification known as carbamylation, which can greatly influence the structure, half-life and biological activity of the modified proteins. Extracellular matrix proteins, such as the vascular basal membrane proteins, due to their long half-life and tissue localization, are at particular risk of this modification. Modified ECM, serving as scaffold for endothelial monolayer, could influence transcriptome and proteome of these cells, thus directly contributing to endothelial dysfunction and development of cardiovascular diseases.			Core Facility	Jun 28, 2023
UBR_Akslen_RNAseq_Human_Cancer_Nerve_2023				
We use an established protocol to differentiate stem cells to neural progenitor cells (NPCs) and neural crest cells (NCCs). We subjected two human breast cancer cell lines (MDA-MB-231 and MCF-7) and one human embryonic cell line (H9) to NPC and NCC differentiation protocol.			Helpdesk	Mar 20, 2023
UBR_Husdaloye_Single_Cell_APS-1_2022				
Single Cell experiments looking at the differences between APS-1 (Autoimmune polyglandular syndrome type 1) cell and normal healthy cells. Overall project contains sensitive data and is in TDS project 0393. This project is to enable the sharing of non-sensitive outputs.			Helpdesk	Jan 27, 2022
UBR_Halberg_CRISPR-Cas9_Library_Screening_Breast_Cancer_Obesity_MDA_2019				
To identify molecular drivers of this aggressive phenotype of obesity-related cancers. RT #14106			Helpdesk	Oct 15, 2019

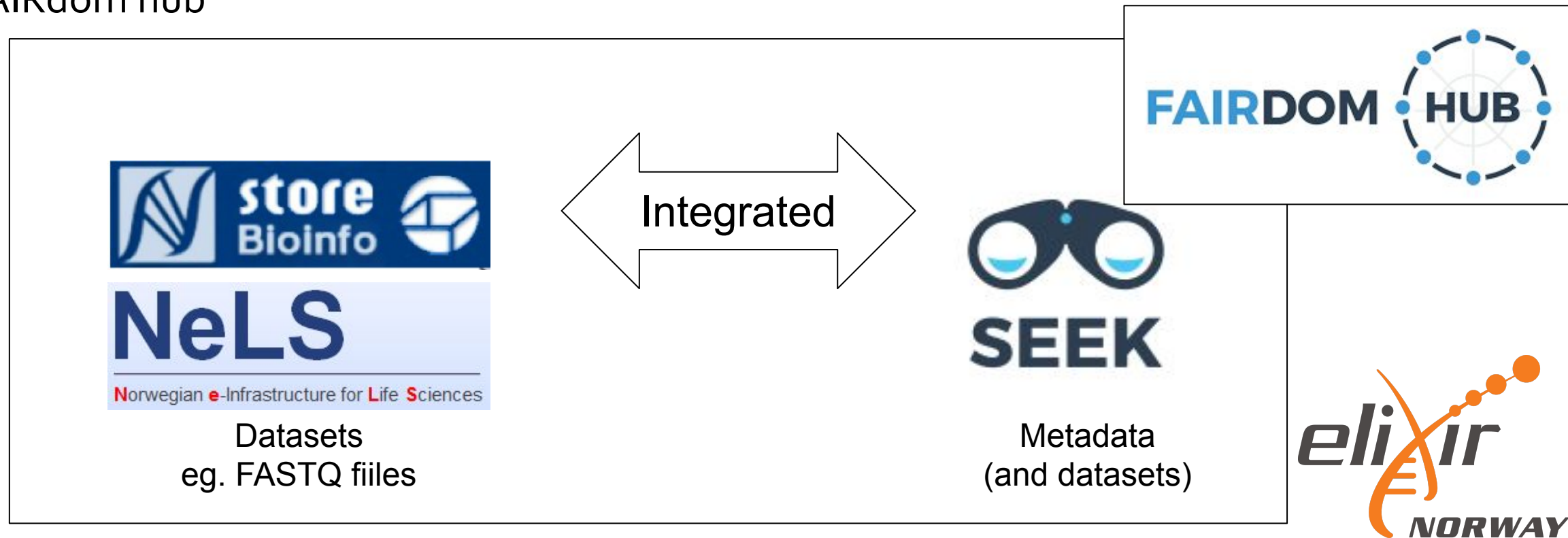
NeLS architecture



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

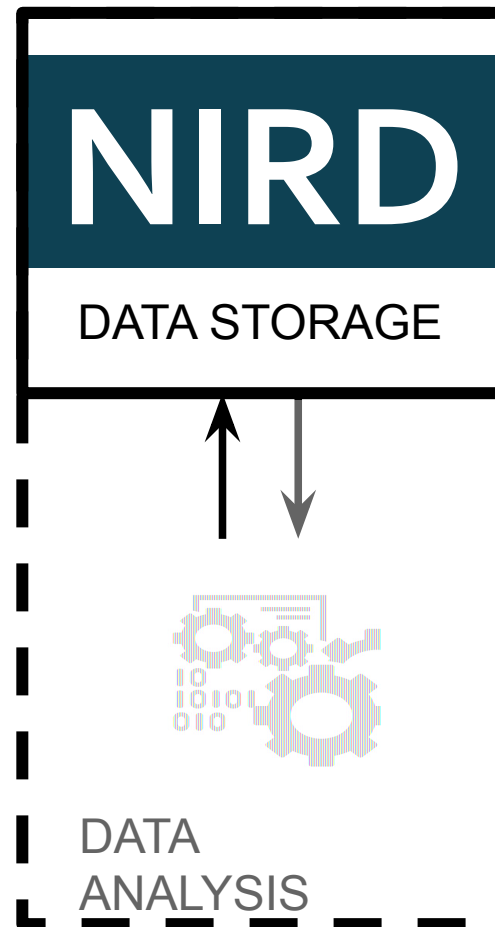


Data storage in NIRD

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:

- **Category A:** Non-commercial projects with resources allocated through the Resource Allocation Committee (RFK) must contribute to the operational expenses of the service. This category should be used in applications to the Norwegian Research Council and other funders, except the EU.
- **Category B:** Non-commercial projects in need of Dedicated Resources, paying for capital and operational expenses.
- **Category C:** Commercial research and industry which will pay market price.
- **Category D:** For applications to the EU, as in-kind value.
- **Category o:** Smaller projects using less than 200 000 CPU core hours pr. year or using less than 7 TB storage pr. year. If any organisation outside BOTT has an aggregated use for smaller projects with a value of more than 50 000 NOK, the organisation needs to contribute given 6 months' notice, for further future use of the infrastructure.

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>

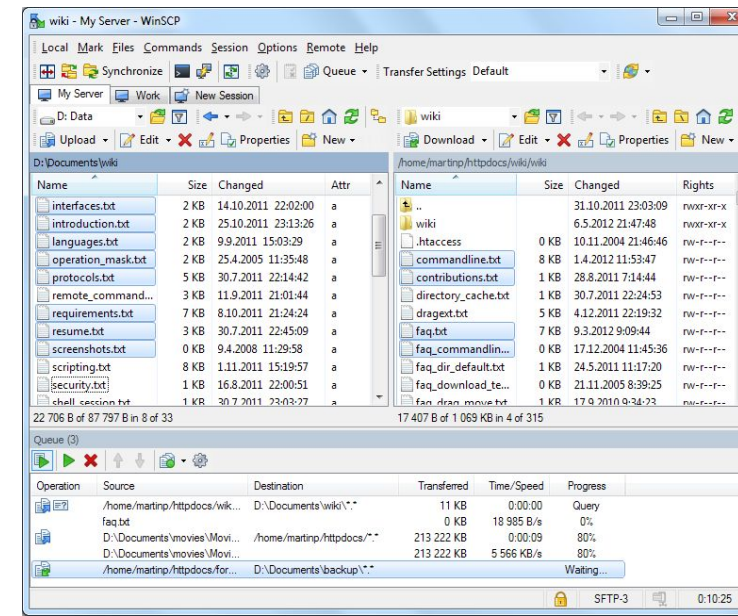
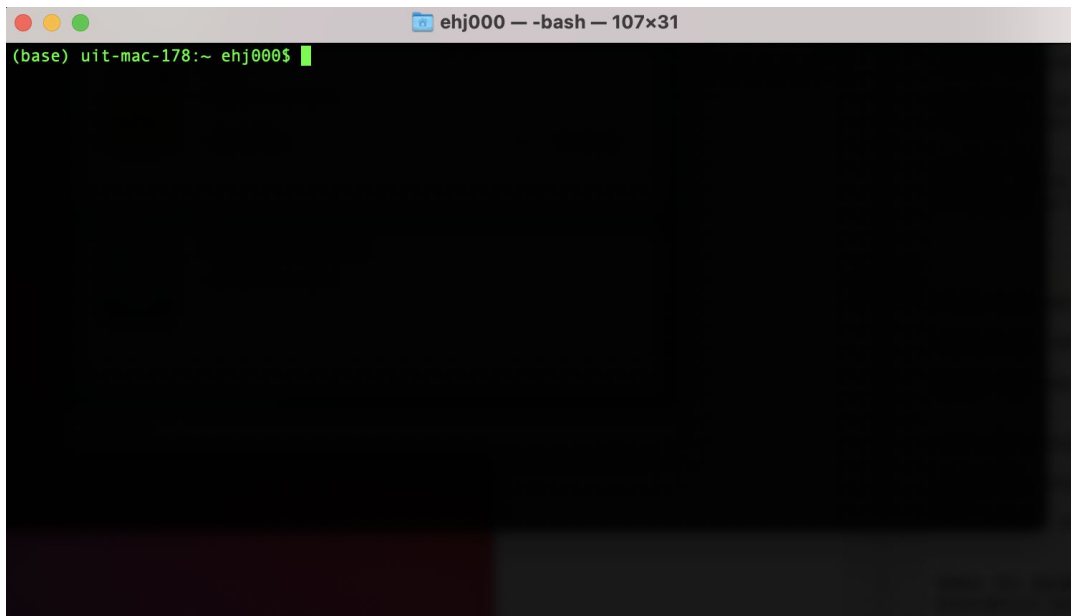
Contribution model: <https://www.sigma2.no/user-contribution-model>



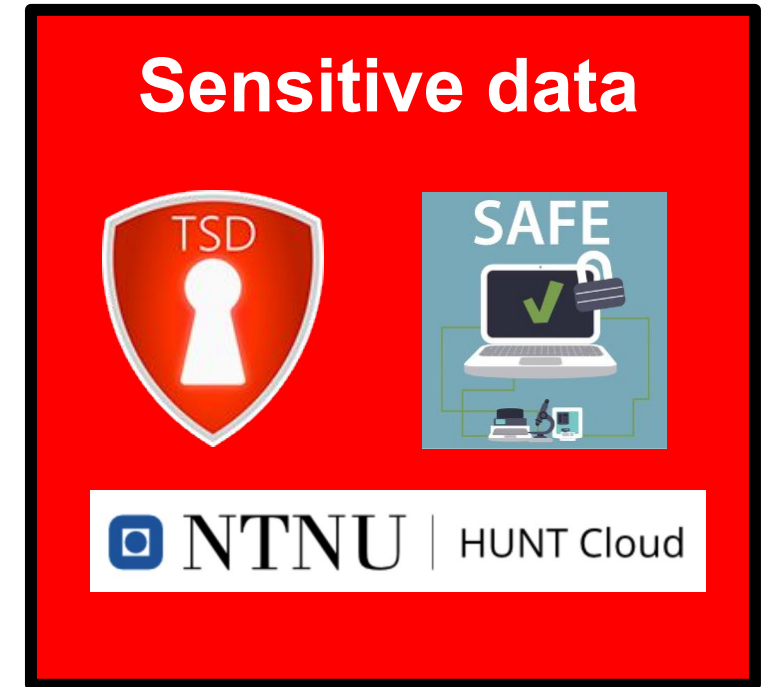
Access data storage in NIRD

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

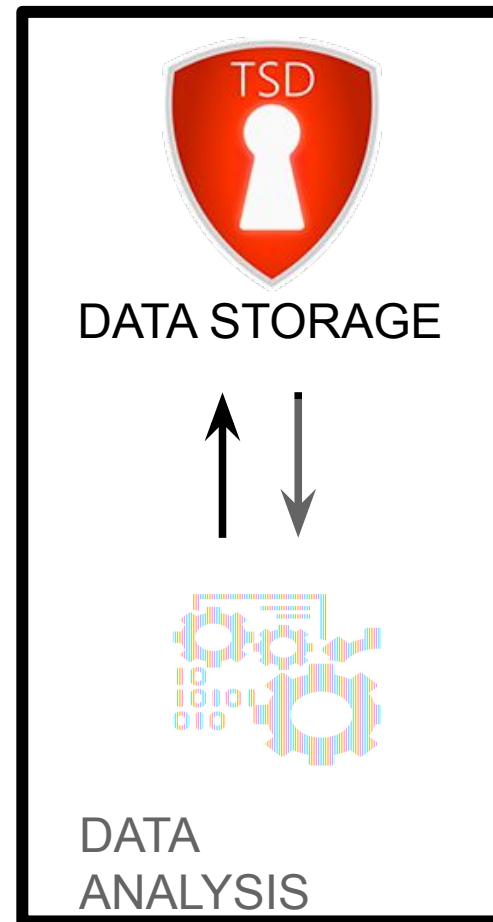
Available to all users with account

Enable collaborative projects

Integrated with compute

Multiple permission roles - shared data

User support: Tech and admin support



Type of data

Sensitive data

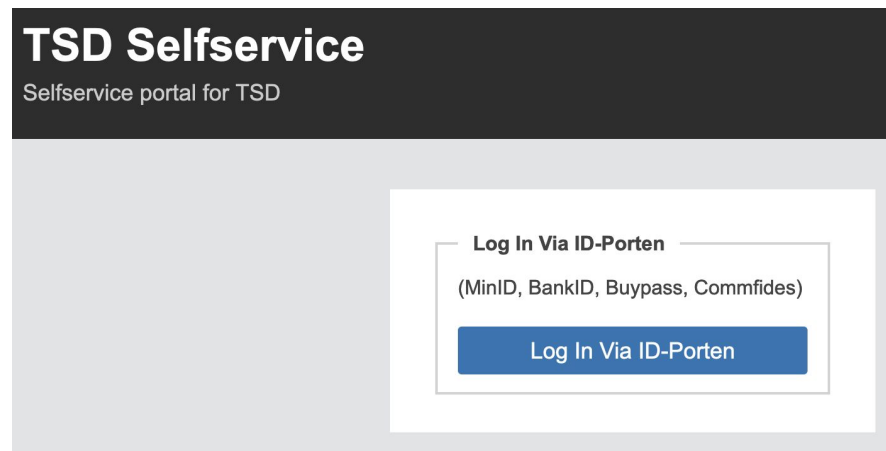
Support multiple data types

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/>

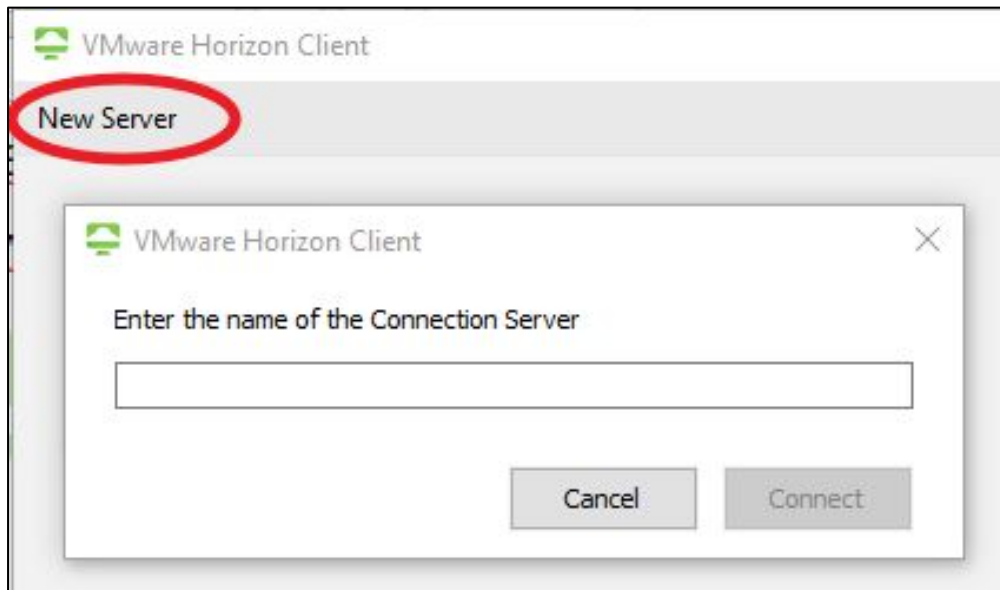
Apply for project: <https://www.uio.no/tjenester/it/forskning/sensitiv/hjelp/start/register.html>

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

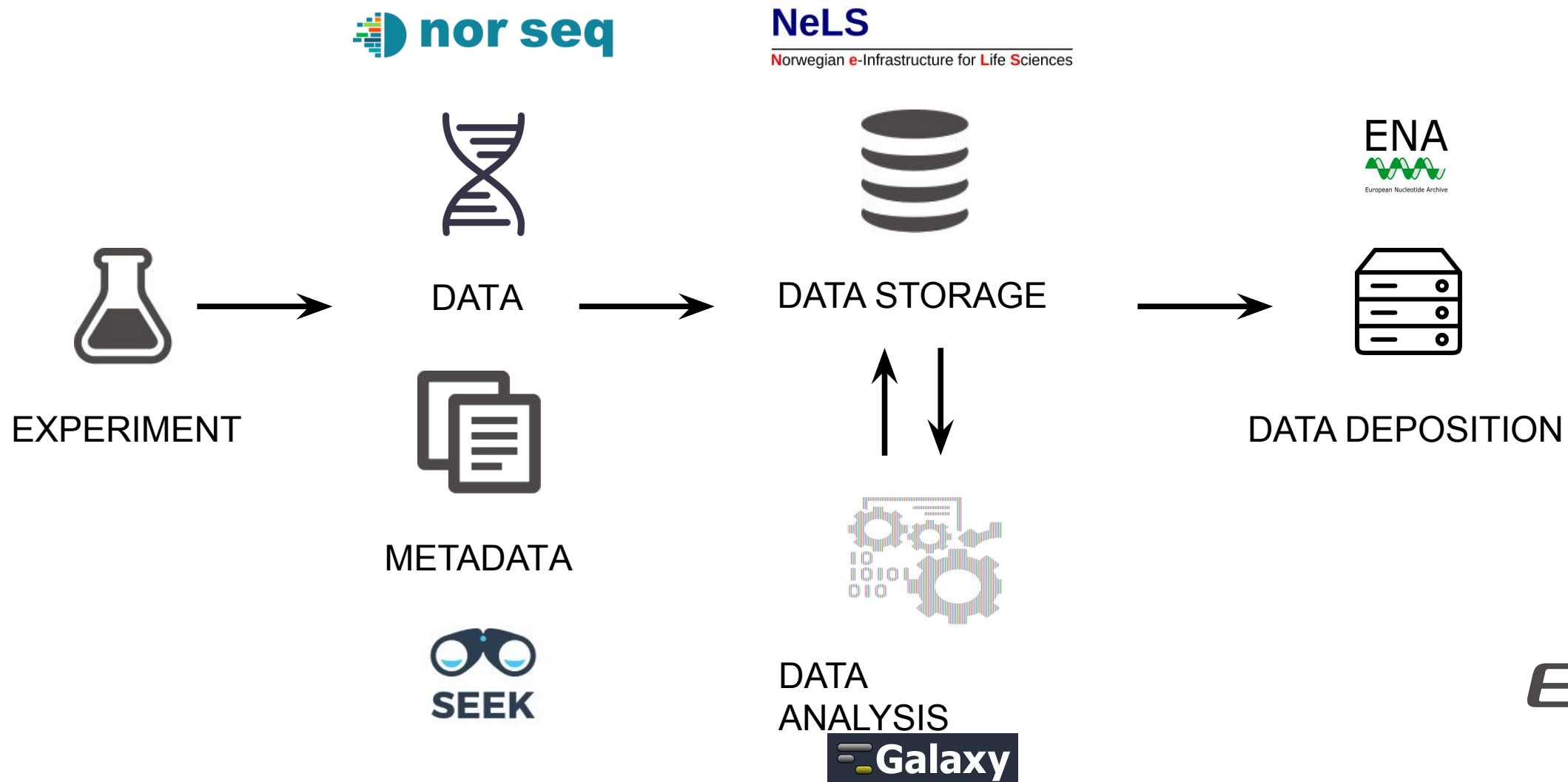


Where should I store and share my life science data?

	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



Thank you!



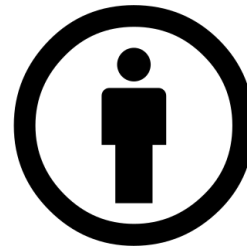
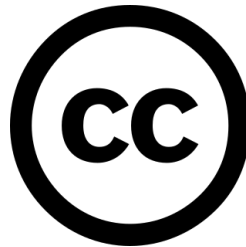
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