



Introduction to NeLS

The national bioinformatics infrastructure

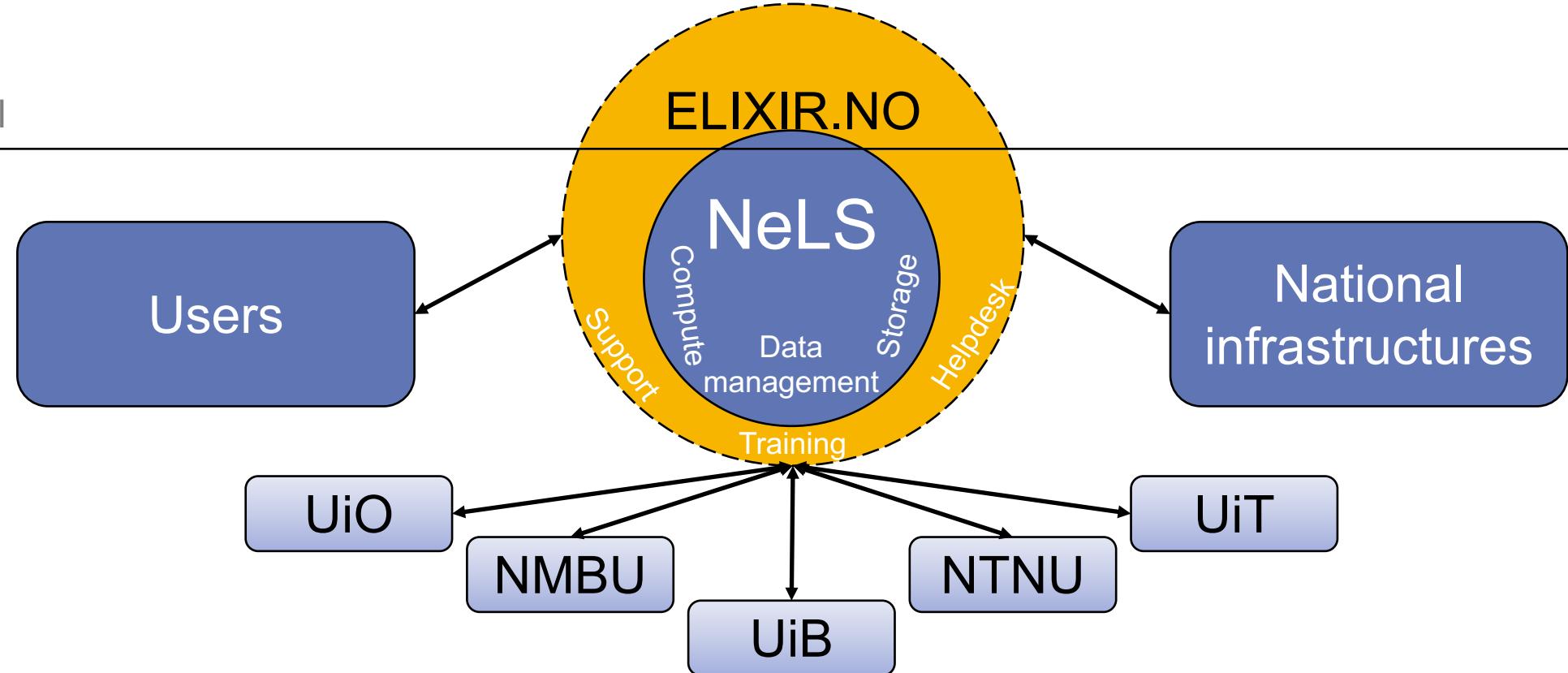
Erik Hjerde



NeLS - the Norwegian e-Infrastructure for Life Science

International

National



Data
management

Data storage

Data sharing

Data analysis

Overview of data management

FAIR data management from data collection to public repository

Sample collection



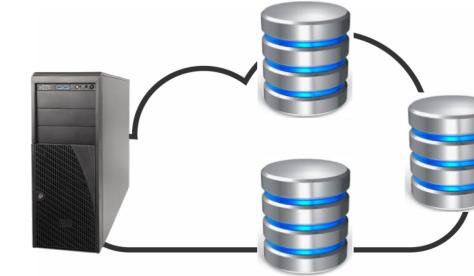
Data production



Data storage/sharing



Data processing



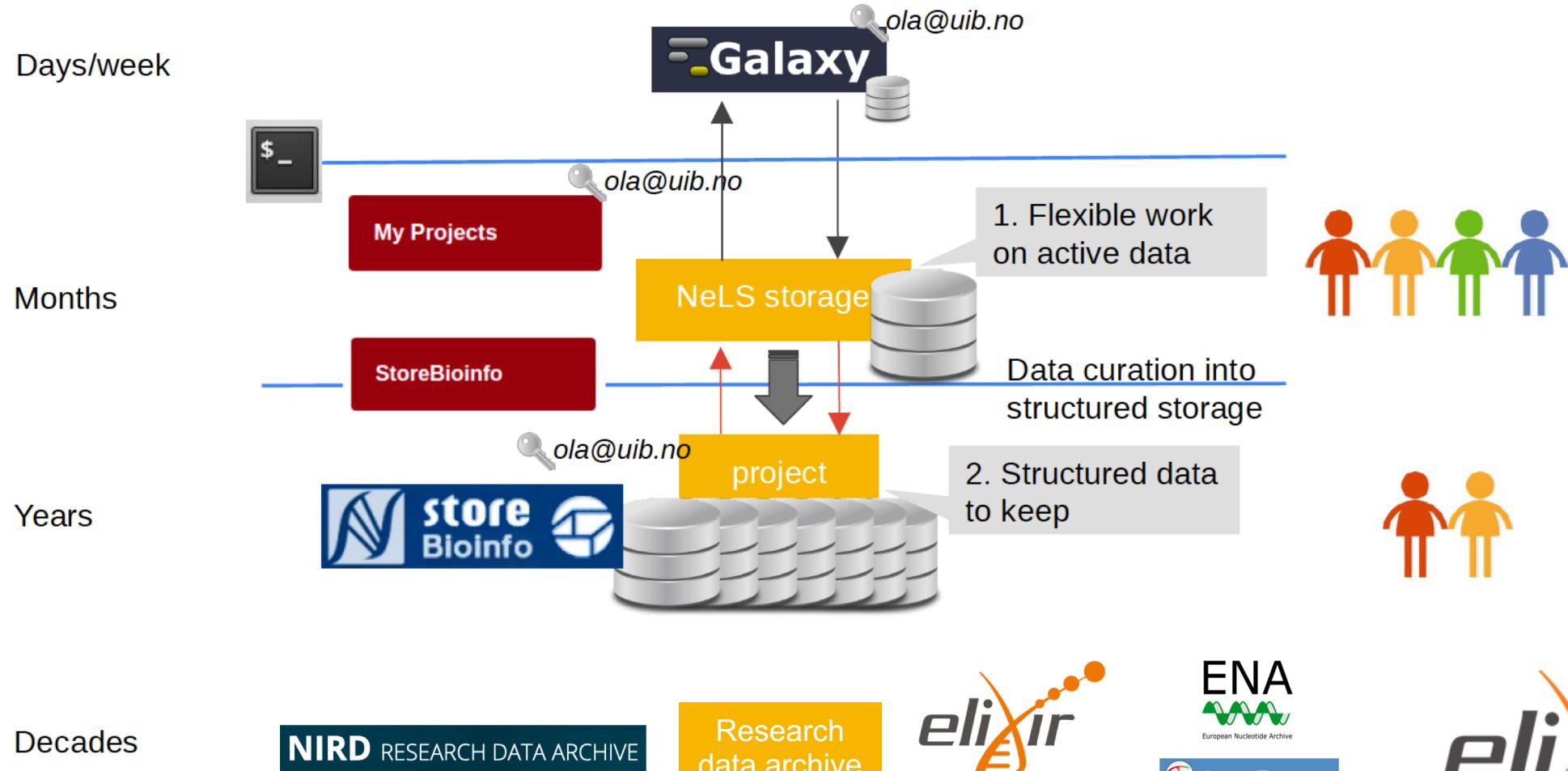
Data achieving



Data management



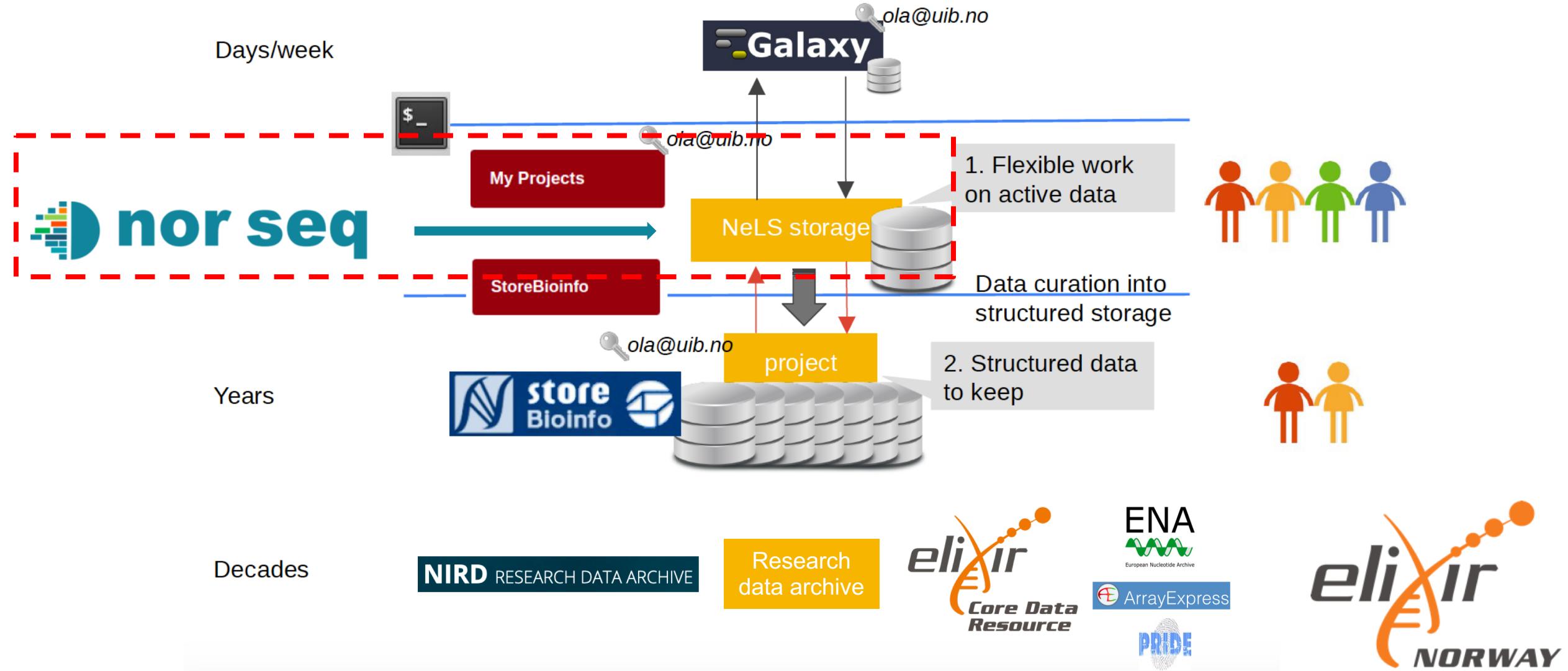
NeLS architecture



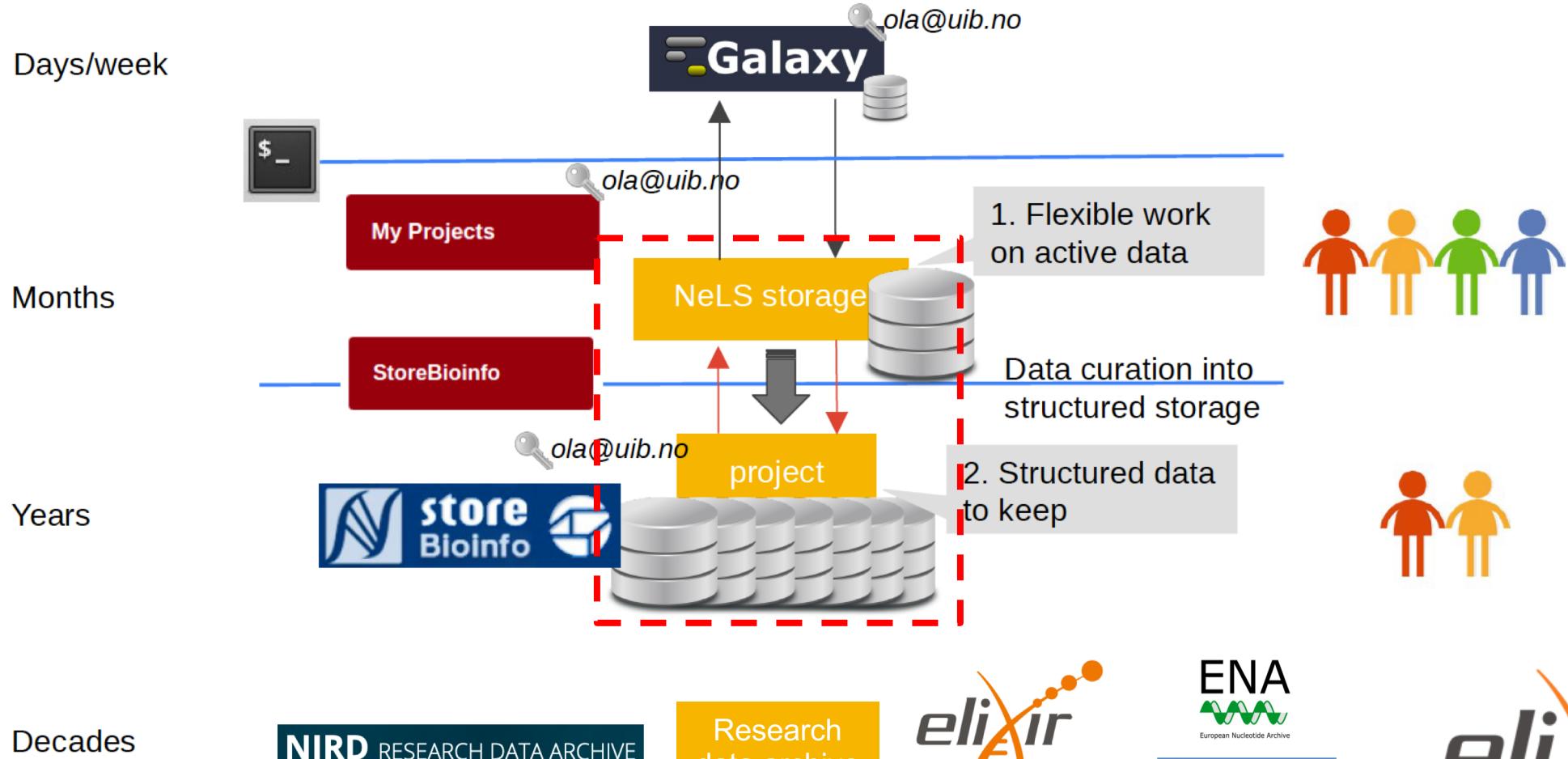
Research
data archive

NIRD RESEARCH DATA ARCHIVE

Data from data providers



Data storage in NeLS and StoreBioInfo



Access to storage and sharing of data in NeLS

Temporary storage – typically during the data analysis and manuscript preparation

Users with permissions can access data in a NeLS project (FEIDE or NeLS ID)

The screenshot shows the NeLS portal interface. At the top, there's a blue header bar with the NeLS logo. Below it, the main content area has three tabs: "Welcome !", "ELIXIR Norway", and "Access NeLS". The "Welcome !" tab is active, displaying a brief introduction about the portal being part of ELIXIR Norway and listing features like Federated login using FEIDE, Sharing of data, Bioinformatics pipelines, and API for integration. The "ELIXIR Norway" tab shows the project's aim to build a Norwegian Node in the pan-European infrastructure ELIXIR. The "Access NeLS" tab shows a "Log in with Feide" form, which is a step in the process of accessing data in a NeLS project.

Welcome !

This is NeLS portal for the administration of Norwegian e-Infrastructure for Life Sciences. NeLS is one of the packages of ELIXIR Norway.

Features

- ✓ Federated login using [FEIDE](#)
- ✓ Sharing of data
- ✓ Bioinformatics pipelines
- ✓ API for integration

Help (Support)

Send an e-mail to contact@bioinfo.no if you have difficulty, question, remark or suggestions. You should include your full name and your affiliation in your request.

ELIXIR Norway

ELIXIR Norway is coordinated by the [University of Bergen](#) and Universities in [Oslo](#), [Trondheim](#), [Tromsø](#) and [Ås](#). It receives funding from the [Research Council of Norway](#) through its research infrastructure programme. This project is also supported by the participating institutions.

The project aim include:

- ✓ To build a Norwegian Node in the pan-European infrastructure [ELIXIR](#), with the Node delivering services to the international community through selected areas
- ✓ To continue a National help desk serving users across the country with services and assistance; and
- ✓ To provide an e-infrastructure allowing users to easily and safely store, share, analyse and publish their genomic data.

Access NeLS

Log in with Feide

NeLS Portal has requested you to log in with Feide.

Log in with your Feide account from **Norwegian University of Life Sciences**. [Not your affiliation?](#)

[Forgot your username or password?](#)

[Log in](#)

[Help](#)

[Privacy and cookie information](#)



Access to storage and sharing of data in NeLS

Access to personal storage and projects

The screenshot displays the NeLS (Norwegian e-Infrastructure for Life Sciences) web application interface. The top navigation bar includes links for NeLS, Dashboard, Personal, Projects, StoreBioInfo, and Help (Support). A user profile for "Erik Hjerde (NeLS ID :34)" is shown in the top right.

NeLS Disk Usage: A chart showing storage usage over time from September 2016 to May 2018. The total capacity is 111.8 GB, with current usage around 74.5 GB.

My Data: A sidebar listing personal data items such as Bio3323, ELIXIR2-WP4, Matt, metagenome, and Test2014. It includes options for Copy, Cut, Paste, Delete Selected, and Click.

Account Information: Displays full name (Erik Hjerde), email (erik.hjerde@uit.no), and affiliation (University of Tromsø).

System Notice: A message indicating successful submission of a task.

Projects: A list of projects managed by the user, including their names, roles, and creation dates.

Project Name	Role in Project	Creation Date
Elixir_NO-Documents	Member Add files & folders, Navigate & Download	November 28, 2014
Uio-Test-Project	Member Add files & folders, Navigate & Download	March 19, 2015
UIO_Halvorsen_RNAseq_Mouse_Spleen_T_cells_2018	Power User Manage File system: Add, Rename, Navigate, Download, Delete all Content	February 22, 2018
Elixir_workshops	Member Add files & folders, Navigate & Download	April 15, 2016
UiB-Petersen_neuro_ma_regulation_disorder_2017	Power User Manage File system: Add, Rename, Navigate, Download, Delete all Content	May 11, 2017
maseq-test-data	Power User Manage File system: Add, Rename, Navigate, Download, Delete all Content	September 11, 2017
ELIXIR2-WP4	Power User Manage File system: Add, Rename, Navigate, Download, Delete all Content	November 8, 2017

Data Operations: A list of completed tasks related to NeLS and StoreBioInfo, showing status, submission time, and completion percentage.

Task Details	Status	Submitted Time	Completion %
5859 : NeLS >> StoreBioInfo	Completed successfully	Tue Jul 02 2019 12:09:41 GMT+0200 (Central European Summer Time)	Completed: 100 %
5858 : NeLS >> StoreBioInfo	Completed successfully	Tue Jul 02 2019 11:07:41 GMT+0200 (Central European Summer Time)	Completed: 100 %
5857 : NeLS >> StoreBioInfo	Completed successfully	Tue Jul 02 2019 10:54:26 GMT+0200 (Central European Summer Time)	Completed: 100 %
5856 : NeLS >> StoreBioInfo	Completed successfully	Tue Jul 02 2019 10:41:28 GMT+0200 (Central European Summer Time)	Completed: 100 %
5855 : NeLS >> StoreBioInfo	Completed successfully	Tue Jul 02 2019 10:33:52 GMT+0200 (Central European Summer Time)	Completed: 100 %
5854 : NeLS >> StoreBioInfo	Completed successfully	Tue Jul 02 2019 10:22:22 GMT+0200 (Central European Summer Time)	Completed: 100 %

Footer: © 2019. Norwegian e-Infrastructure for Life Sciences. All right reserved. https://nels.bioinfo.no/pages/file-browse.xhtml?path=cUZMaldtN

Data storage in StoreBioInfo

Long term storage – typically for large projects where data is used in several publications

Storage quotas has to be applied for – typically > 1TB data

NeLS Dashboard Personal Projects StoreBioInfo Help (Support) Erik Hjerde (NeLS ID :34)

NeLS You are at : » / Personal Projects

StoreBioinfo You are at : » StoreBioinfo

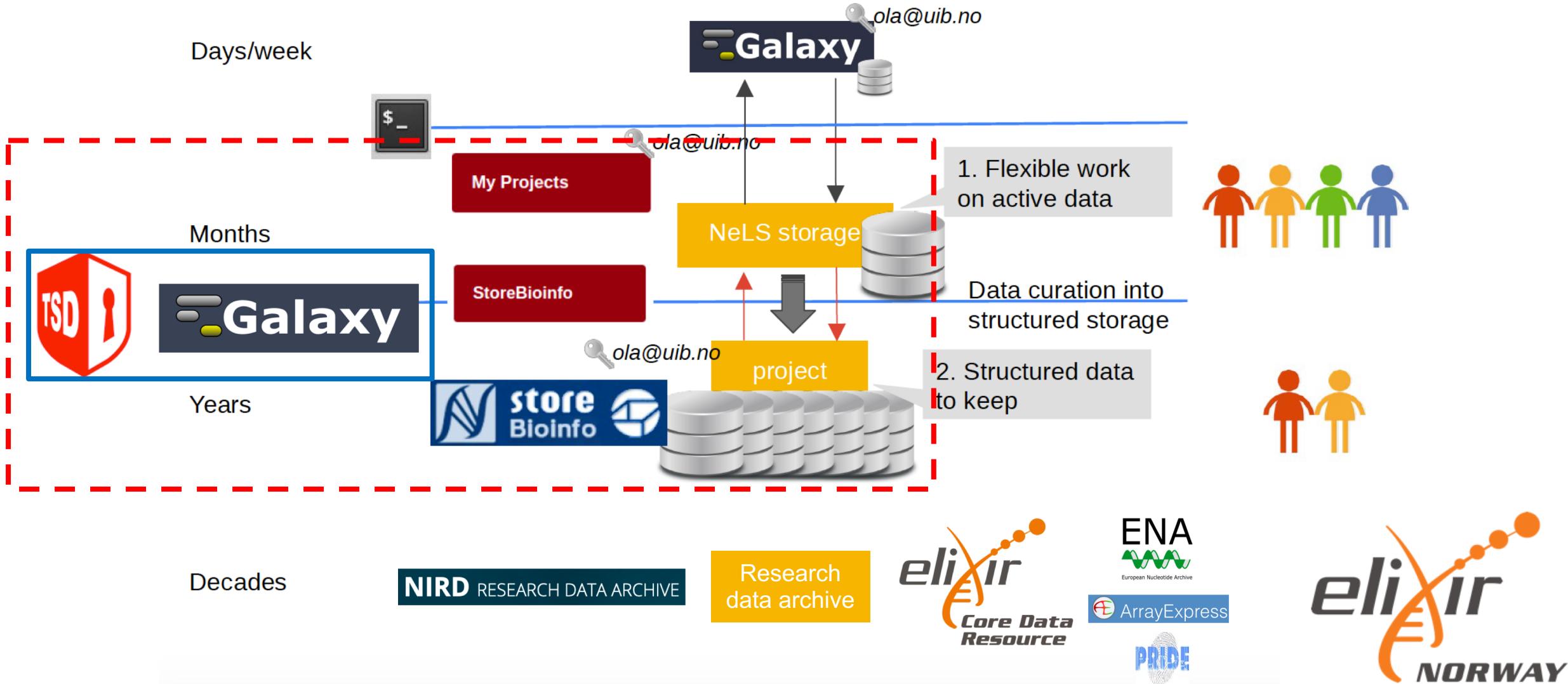
Projects

Name	Creation Date
UiT_bioinformatics_platform_core_storage_facilities_20	October 5, 2018
UNN_Goll_Metagenome_Human_IBS_Faeces_2018	March 19, 2019
UiB-Petersen_neuro_rna_regulation_disorder_2017	May 11, 2017
Elixir-demo	November 24, 2015

Data Operations

- 5859 : NeLS >> StoreBioinfo Status: Completed successfully Submitted time: Tue Jul 02 2019 12:09:04 GMT+0200 (Central European Summer Time) Completed: 100 %
- 5858 : NeLS >> StoreBioinfo Status: Completed successfully Submitted time: Tue Jul 02 2019 11:07:41 GMT+0200 (Central European Summer Time) Completed: 100 %
- 5857 : NeLS >> StoreBioinfo Status: Completed successfully Submitted time: Tue Jul 02 2019 10:54:26 GMT+0200 (Central European Summer Time) Completed: 100 %
- 5856 : NeLS >> StoreBioinfo Status: Completed successfully Submitted time: Tue Jul 02 2019 10:41:28 GMT+0200 (Central European Summer Time)

Sensitive data in TSD



TSD – Tjenester for Sensitive Data

National infrastructure for computing and data management of sensitive data

Fulfils the requirements by Norwegian law for treatment and storage of sensitive data

TSD is developed and hosted by USIT at the UiO

The NeLS-portal is the only web entry point to get data in and out of TSD

The screenshot shows the University of Oslo website with a dark header. The header includes the university's logo, the text "UiO Universitetet i Oslo", and links for "For ansatte", "English website", and a search bar. Below the header, a navigation bar has links for "Forsiden", "Forskning", "Studier", "Livet rundt studiene", "Tjenester og verktøy" (which is highlighted in blue), "Om UiO", and "Personer". On the left, there is a sidebar with links: "Tjenester og verktøy" (highlighted in blue), "IT-tjenester", "IT-støtte i forskning", "Tjenester for sensitive forskningsdata" (highlighted in dark grey), and "Om TSD". The main content area is titled "Tjenester for Sensitive Data (TSD)". It contains a brief description of TSD, a list of features, and a "Aktuelt" section with news items. A red "TSD" logo is on the right.

Tjenester for Sensitive Data (TSD)

TSD gir forskere ved UiO og ved andre offentlige forskningsinstitusjoner en forskningsplattform som oppfyller lovens strenge krav til behandling og lagring av sensitive forskningsdata. TSD utvikles og driftes av USIT ved UiO, og inngår i NorStore, den nasjonale infrastrukturen for håndtering og lagring av vitenskapelige data.

- En introduksjon til TSD
- Systembeskrivelse med risikovurderinger og whitepaper
- Medieomtale
- Aktive forskningsprosjekt
- Kontaktinformasjon

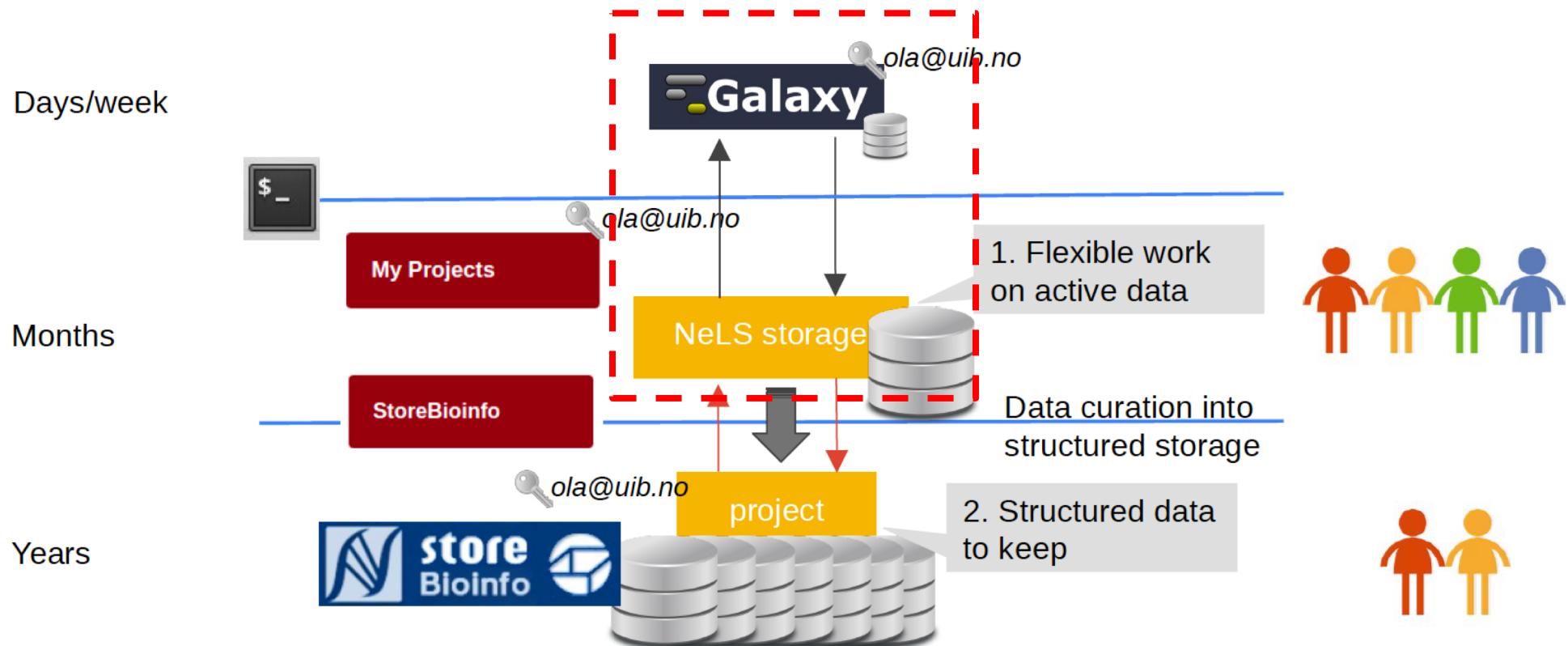
Hjem kontakt jeg?
→ Se kontaktpunkter for TSD

Aktuelt

- 2016-01-20 New feature: Web browser login to Windows VMs!
- 2016-04-27 New feature: /tsd/pxx/home visible from Colossus



Data analysis



Data analysis in NeLS Galaxy

Each node host a Galaxy server with unique “flavour”

NeLS galaxy-uit.bioinfo.no

Analyze Data Workflow Shared Data Visualization Admin Help User

Welcome to the NeLS Galaxy installation in Tromsø

Galaxy is a web-based platform for data intensive life science research that provides users with a unified, easy-to-use graphical interface to a host of different analysis tools. These tools can be run interactively, one by one, or combined into multi-step workflows that can be executed as a single analysis.

If this is your first time using Galaxy, you might want to have a look at this [Quick Start Guide](#). Additional documentation and tutorials on using Galaxy can be found [here](#).

This Galaxy server has limitations on disc usage, and you have currently used **117.9 GB** of your total quota of **250.0 GB**. To free up disc space, please move your files to the NeLS Storage after you are finished with them. If you require a larger disc quota, contact the help desk or the local Galaxy administrator.

Tweets by @eliximorway

ELIXIR Norway Retweeted

Inge Jonassen @ingejonassen Inspiring days at @elixirnorway all hands meeting in Oslo - stepping up Data Management efforts nationally and in @ELIXIREurope

[View on Twitter](#)

Tools and Workflows

Contact Support

ELIXIR.NO aims to develop tools and workflows for specific data analysis tasks, based on input from large user groups and help-desk users in Norway and also toward ELIXIR internationally. To see a list of analysis workflows available on this Galaxy server, click the "Shared Data" menu at the top of the page and select [Published Workflows](#). Visit the [NeLS Portal](#) to see the full list of [analysis pipelines](#) available in all the NeLS Galaxies.

Other NeLS Galaxy installations and resources

The Galaxy installations at each of the participating universities have differing focus and may offer different sets of tools and functionalities.

University of Oslo University of Bergen Norwegian University of Science and Technology Norwegian Univ. of Life Sciences lifeportal NeLS NeLS Portal

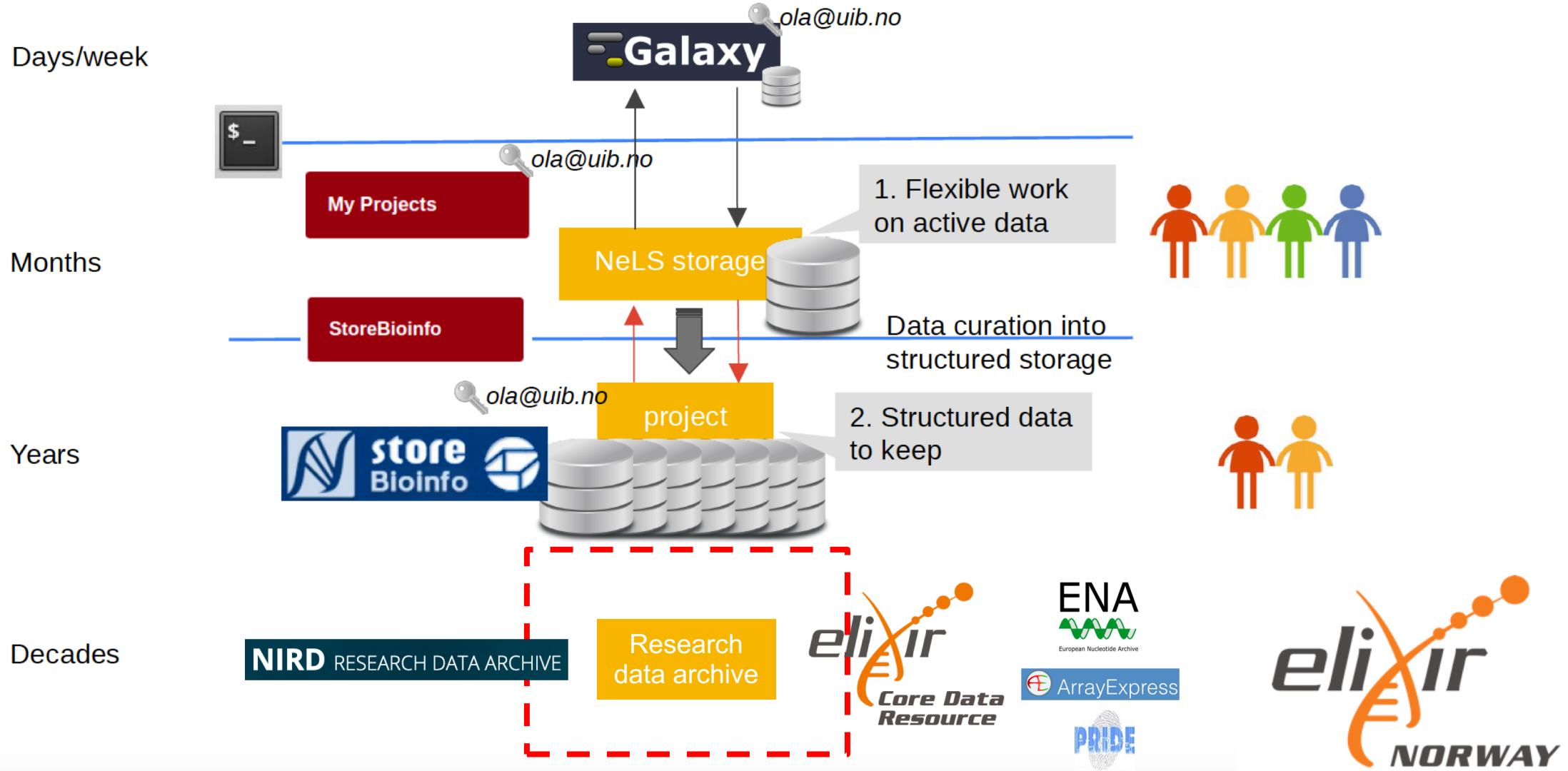
History

Copy of 'test Exercise I'
3 shown, 1 deleted, 12 hidden
8.5 KB

16: Concatenate datasets on data 15 and data 14
2: file2.txt
1: file1.txt



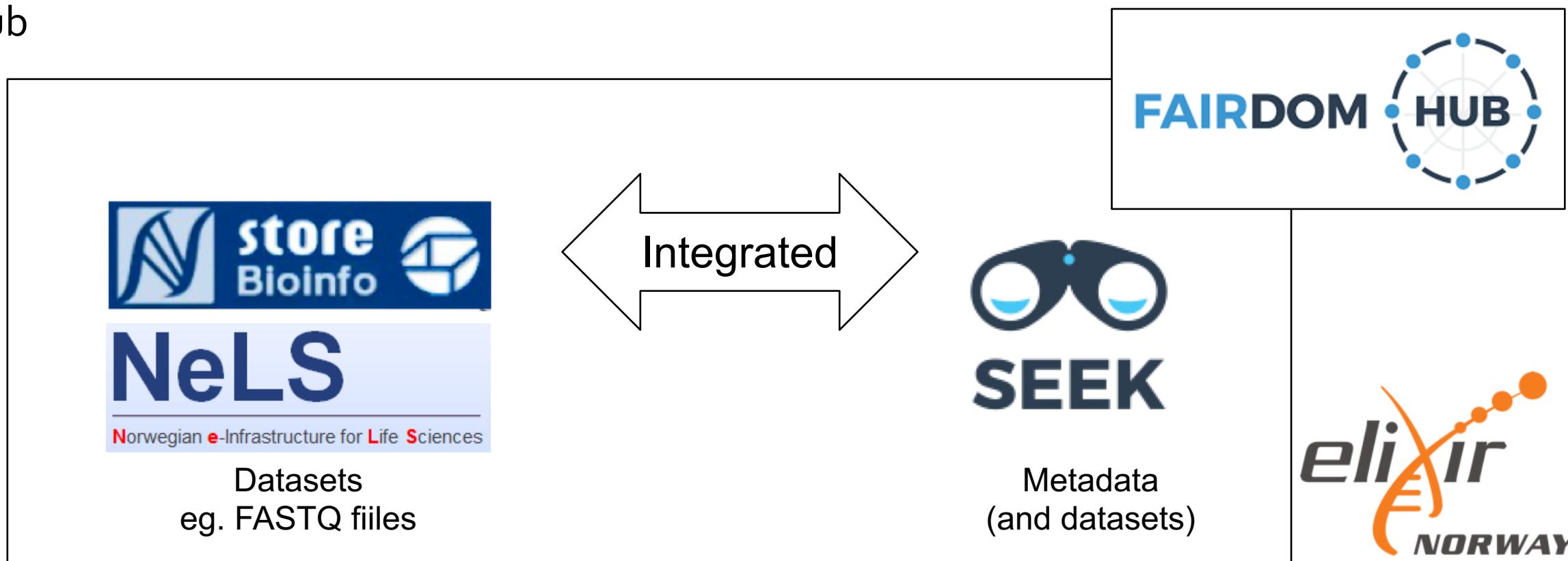
Data archiving in data repositories



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

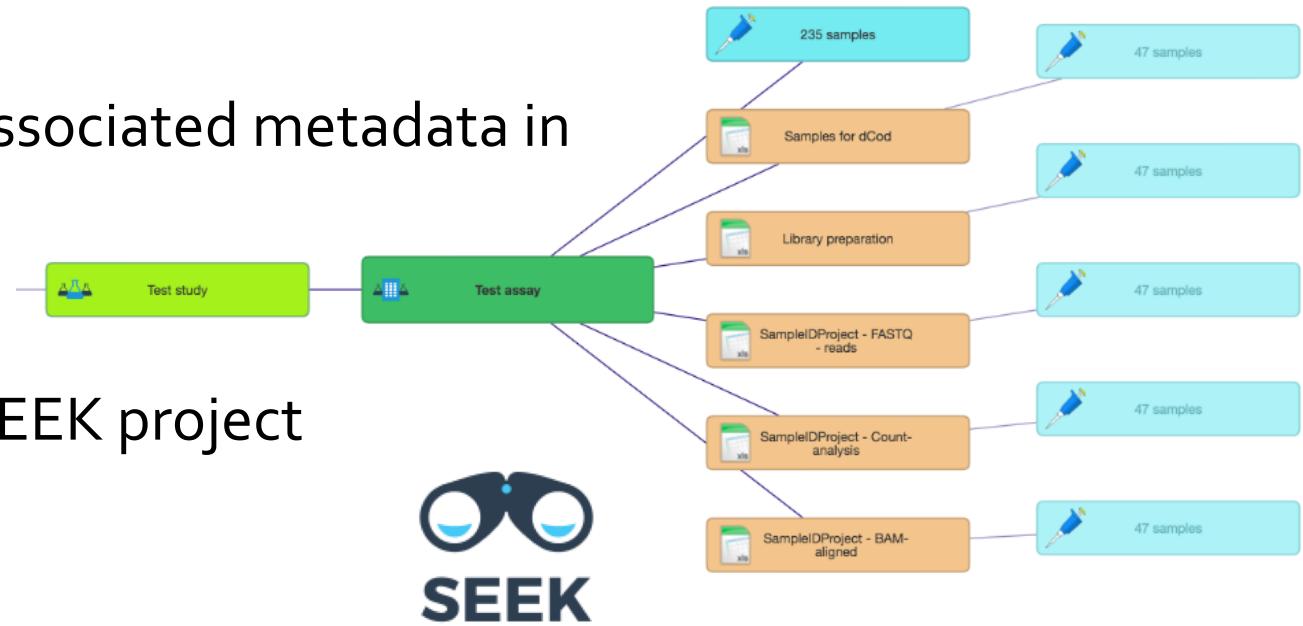
The SEEK platform is a web-based tool for organising and storing data, and for exploring and annotating data

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



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

Typically, organise the project with associated metadata in SEEK



Link datasets stored in NeLS to the SEEK project

Name	Size
10_S18_R1_001.fastq.gz	1.3 MB
10_S18_R2_001.fastq.gz	1.3 MB
11_S21_R1_001.fastq.gz	1.3 MB
11_S21_R2_001.fastq.gz	1.3 MB
12_S3_R1_001.fastq.gz	1.3 MB
12_S3_R2_001.fastq.gz	1.3 MB
13_S7_R1_001.fastq.gz	1.3 MB
13_S7_R2_001.fastq.gz	1.3 MB
14_S11_R1_001.fastq.gz	1.3 MB
14_S11_R2_001.fastq.gz	1.3 MB

Integrated

Test assay

No description specified

SEEK ID: http://158.39.77.39/assays/1
Class: Experimental assay
Contributor: Firm Bacall
Projects: NeLS-enabled project
Investigation: Test investigation
Study: Test study
Assay type: Experimental Assay Type
Technology type: Technology Type
Organisms:

Selected: Test assay
Type: Experimental assay

Contributor and Creators

Activity

Tags

FAIRDOM NeLS

```
graph TD; TestAssay[Test assay] --- TestStudy[Test study]; TestAssay --- Samples235[235 samples]; TestAssay --- SamplesdCod[Samples for dCod]; TestAssay --- LibraryPrep[Library preparation]; TestAssay --- SampleIDFastQ[SampleIDProject - FASTQ - reads]; TestAssay --- SampleIDCount[SampleIDProject - Count-analysis]; TestAssay --- SampleIDBAM[SampleIDProject - BAM-aligned];
```

