MEDINFO23

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Architecture of the mass spectrometry data management pipeline in the SMART-CARE project

SMARTCARE

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Introduction

- Cancer recurrence main cause of cancer-related deaths [1]
- Personalized cancer treatment based on genomics helps development of new therapies
- Proteome and metabolome analyses may accelerate novel approaches and reduce relapse mortality
- Systems medicine as strategy

[1] Dilllekas H [..]Straume O. Cancer Med. 2019

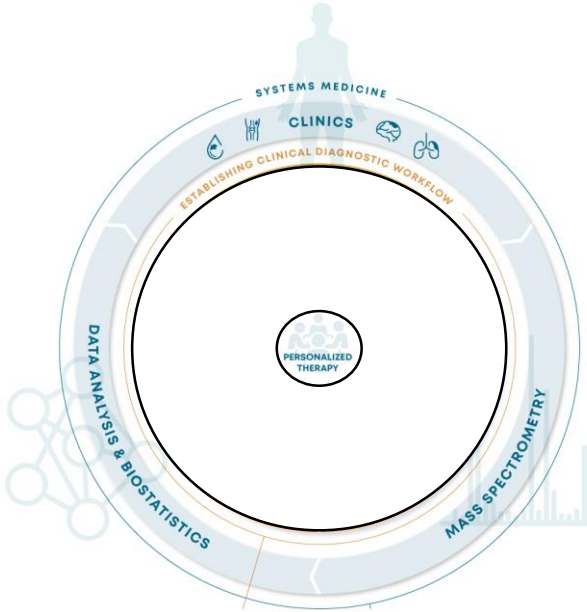
*-Omics

DNA	→	GENOMICS
RNA	→	TRANSCRIPTOMICS
PROTEINS	→	PROTEOMICS
METABOLITES	→	METABOLOMICS

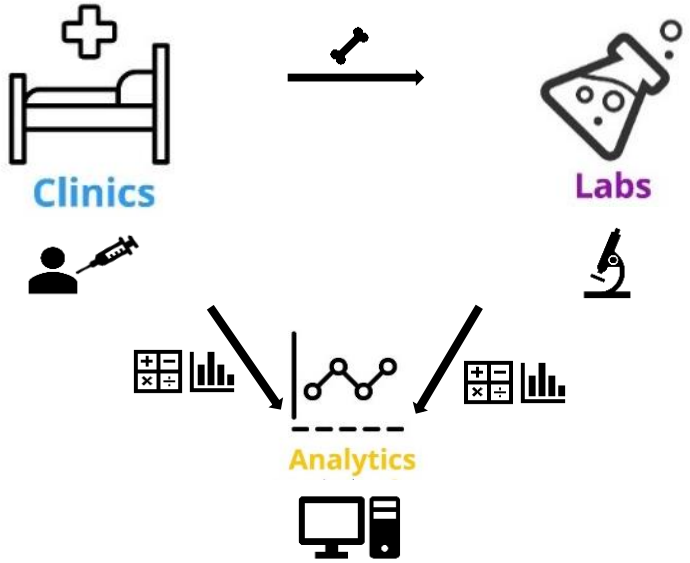
SMART-CARE project

Medical informatics goal:

Establish a **reliable, performant platform** and **data exchange system** that supports integration of proteomic and metabolomic analysis of patient cancer samples, multi-omic profiling, bioinformatic analysis, mathematical modeling and setup towards a clinical exploitation.



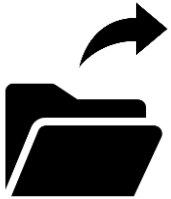
Workflow in SMART-CARE



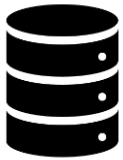
- specimen extraction
- specimen transportation
- analysis (metabolome/proteome)
- analysis of metabolomic/proteomic output
- comprehensive data analysis

Requirements

Pseudonymization



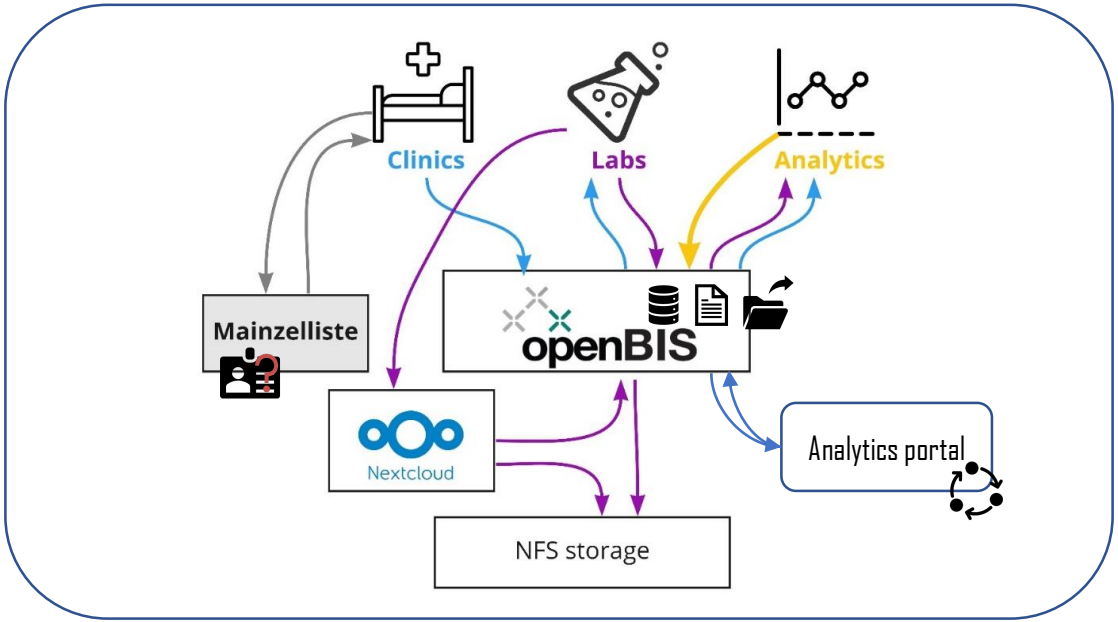
Data retrieval



Data storage
(raw/processed)

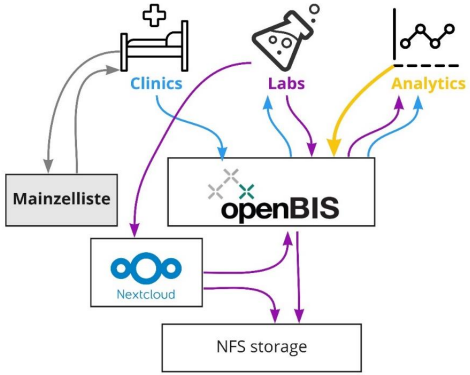
Automatic data analysis

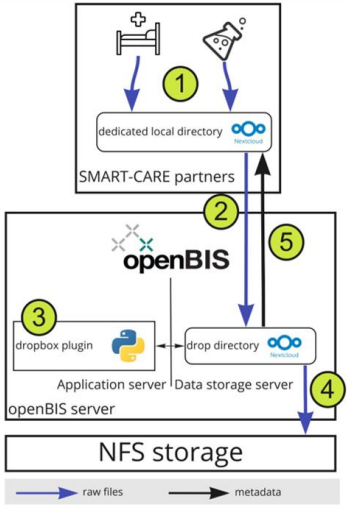
SMART-LDR architecture



openBIS

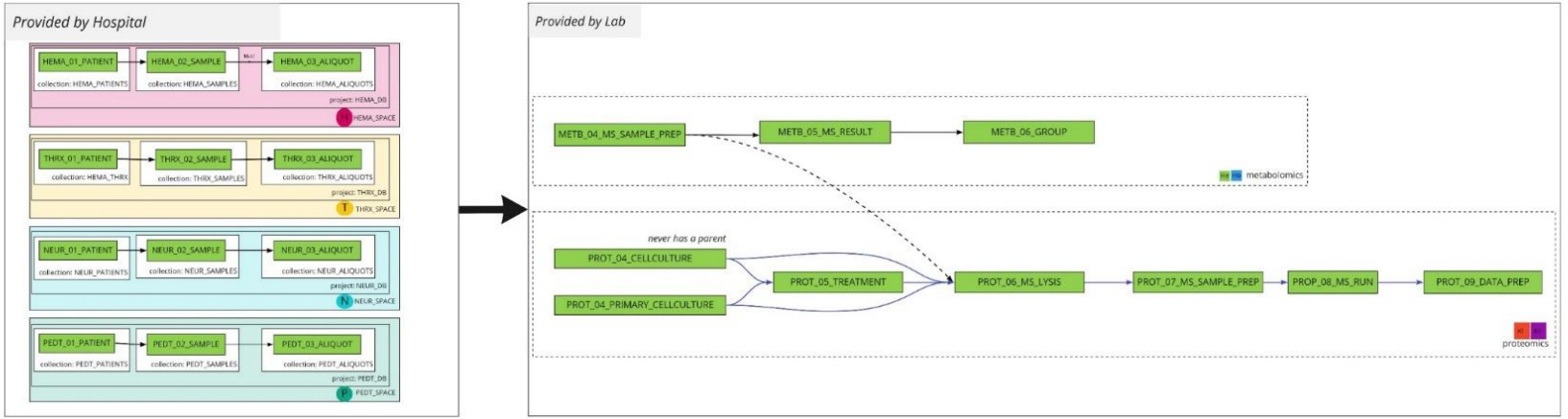
- Data capture
- Core plugins
  - Mainzelliste -> pseudonymization
  - Upload via nextcloud interface
  - Entity validation plugins





Nextcloud upload workflow

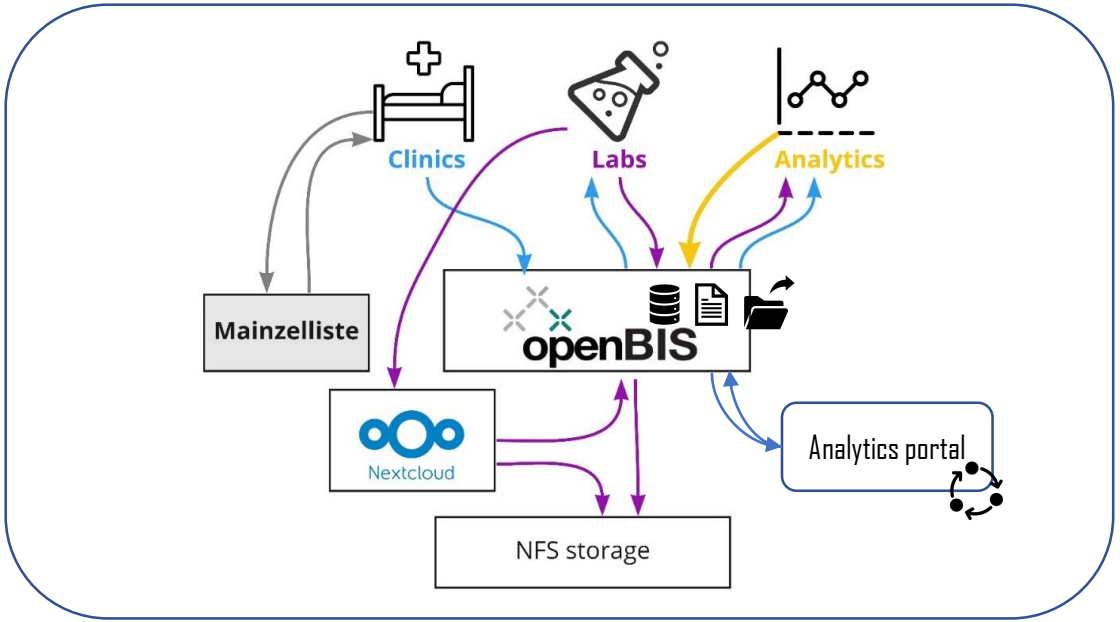
Hierarchical data structure



Discussion

- Complex combination of individual components that enable automated data exchange and analysis through interfaces
- Adaptation of setup in clinical and laboratory processes challenging
- Harmonization of input masks between clinics very complex

SMART-LDR architecture



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