

# Large Infrastructures and Networks

ATHENA

## Secure exchange of health data across European Union member states

- Unified and **interoperable** digital health ecosystem
- Common European data **governance principles, standards, and infrastructure** for health data exchange  
→ privacy, security, and compliance with regulatory frameworks (GDPR)
- Connection of health data from various sources (health records, genomics, patient-reported outcomes)  
→ **patient-centered healthcare**
- **Control of individuals** over their health data (data portability, consent management, transparency)
- Interoperability - seamless flow of health data across borders and healthcare systems  
→ cross-border healthcare, research collaborations
- Common health goals across the European Union

*Type of collaboration*  
*Aligning EDITH data management strategy with the EHDS*



# EBRAINS

Open research infrastructure that gathers data, tools and computing facilities for brain-related research

- **EBRAINS Knowledge Graph**: a metadata management system built for EBRAINS
- seamless **integration** of various components
- analysis, simulation, and visualization tools without complex installation procedures.
- **CWL Standardised Workflows** (unique Digital Object Identifiers)
- **National Nodes** structure

*Type of collaboration*  
*Technology roadmap alignment, collaboration and standardisation*



Ecosystem  
for Digital Twins  
in Healthcare

## a 'Web of FAIR Data and Services' for science in Europe

- seamless and **open environment** for researchers to access, share, and **reuse** digital resources across disciplines.
- **federated** infrastructure
- diverse datasets, tools, and services (easily integrated)
- principles of **open science** - transparency, accessibility, inclusivity
- common set of standards and policies to facilitate the integration of data and services
- data-driven research
- adoption of **FAIR** (Findable, Accessible, Interoperable, and Reusable) principles to enhance the quality and usability of research data

*Type of collaboration*  
*Standards and federation*



# European Life-sciences Infrastructure for Biological Information

pan-European research infrastructure that focuses on facilitating access to and management of biological data for life sciences research.

- **distributed infrastructure**, connecting bioinformatics resources, databases, and services across Europe to enable seamless collaboration and data sharing
- bioinformatics tools and resources (FAIR principles)
- **harmonization** of biological data.
- long-term sustainability of bioinformatics resources by providing training, best practices, and support for data management and analysis.
- platform for the development and implementation of **data standards** and **workflows** to enhance the quality and interoperability of biological data.
- **ELIXIR Nodes** (distributed across different countries)

*Type of collaboration*  
*Standards and data sharing including model development and simulation*

# Open Access Infrastructure for Research in Europe

pan-European infrastructure dedicated to supporting and promoting open access to scholarly publications and research data

- **network** of interconnected repositories
- **open science principles**, emphasizing transparency, accessibility, and reusability of research outputs.
- implementing and advancing **open access policies**
- centralized gateway for researchers to **deposit, access**, and link their publications and datasets
- ensuring that publicly funded research outputs are **openly** accessible.
- **OpenAIRE Research Graph**: connects publications, projects, datasets, and other research entities, enhancing the discoverability of research outputs.
- OpenAIRE in **EOSC**: foundation for **open access** and **open data services** within the broader European research landscape

*Type of collaboration*

*Open Access to EDITH Publications, deposited in an OpenAIRE-compliant repository*

# Computing Infrastructures and Initiatives (1/2)

- **EuroHPC:** advances European petascale and pre-exascale systems.
- **LUMI:** key EuroHPC pre-exascale system.
- **PRACE:**
  - bottom-up, science-driven computing and data management
  - complementing Euro-HPC
- **Fenix: e-infrastructure:** data repositories, supercomputing resources.

# Computing Infrastructures and Initiatives (2/2)

- National / Regional resource federations, e.g. **PL-Grid** infrastructure
- **GÉANT**: connects European research networks
- **EGI**: open solutions for advanced computing and data analytics.
- **CompBioMed**: computational methods for biomedical applications.
- **PerMedCo**: HPC Center of Excellence for Personalized Medicine in Europe.
  - PerMedCoE's tools / benchmarking are valuable for multiscale resource integration and model validation in the HDT creation.



# Other initiatives



## EUDAT CDI (Collaborative Data Infrastructure)

- pan-European initiative, collaborative framework for preserving, sharing, and managing research data across diverse scientific communities.
- one of the largest infrastructures of integrated data services and resources supporting research in Europe. (network of more than 20 European research organisations, data and computing centres)

## European Cancer Imaging Initiative



- innovation and deployment of digital technologies in cancer treatment and care
- achieve more precise and faster clinical decision-making, diagnostics, treatments and predictive medicine for cancer patients.

# Other initiatives



## Genomic Data Infrastructure (GDI)

- access to genomic and related phenotypic and clinical data across Europe
- federated, sustainable and secure infrastructure to access the data

## Research Data Alliance (RDA)



- open and interoperable sharing of research data (global scale).
- launched as a community-driven initiative in 2013 by the European Commission, the United States Government's National Science Foundation and National Institute of Standards and Technology, and the Australian Government's Department of Innovation

# Other initiatives



## Gaia-X

gaia-x

- digital governance that can be applied to any existing cloud/ edge technology stack to obtain transparency, controllability, portability and interoperability across data and services



# Starting now (January 2024):

## Virtual Brain Twin

- Ecosystem for generating **virtual brain twins** for psychiatric patients.
- Virtual Brain Twin platform
  - **Big data, multiscale modelling, and high-performance computing (HPC)**
  - Embedded in the European digital neuroscience research infrastructure **EBRAINS**
  - Aimed for **neuroscientists, clinical researchers**, and mathematical **modelers**, and in the future, to **clinicians**, and **patients** as well.
  - Pave the way for **personalised treatment of psychiatric disorders**
  - Potential to **significantly improve** the quality of life of patients

# Other large infrastructures and networks?

<http://www.edith-csa.eu>

Deliverables available under tab 'dissemination/material'

Indication of interest via de contact form on site