NFDI4Biodiversity – Biodiversity, Ecology and Environmental Data

HeFDI, 11.02.2022

Research data

Research data is data created in the course of scientific activity,
e. g. through observations, experiments, simulations, surveys, interviews,
the study of sources, records, digitisation, or evaluations.

In actual research, one differentiates, although not always clearly,
between **primary research data** and **secondary research data**, which
documents and **contextualises** the process of creating primary data.

Rat für Informationsinfrastrukturen, 2016

Origin of data

publicly funded for example …

… at over 400 universities and technical colleges

… at the non-university research institutions and the scientific academies

… in large, jointly funded research infrastructures

Area of activity of the Joint Science Conference of the federal government and federal states (Article 91b of the Basic Law) ↗
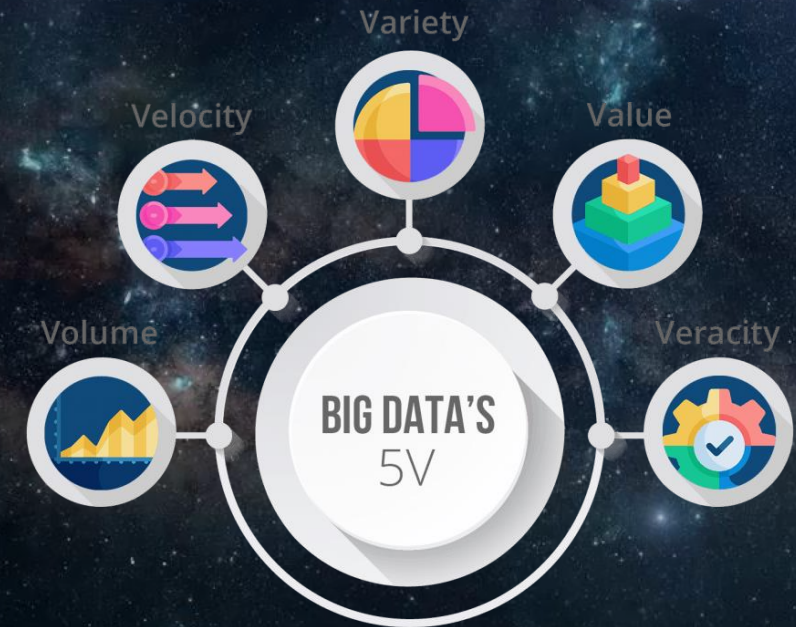
German R&D under the microscope

A self-ranked assessment of how public and private research organizations in Germany are funded and their research priorities.
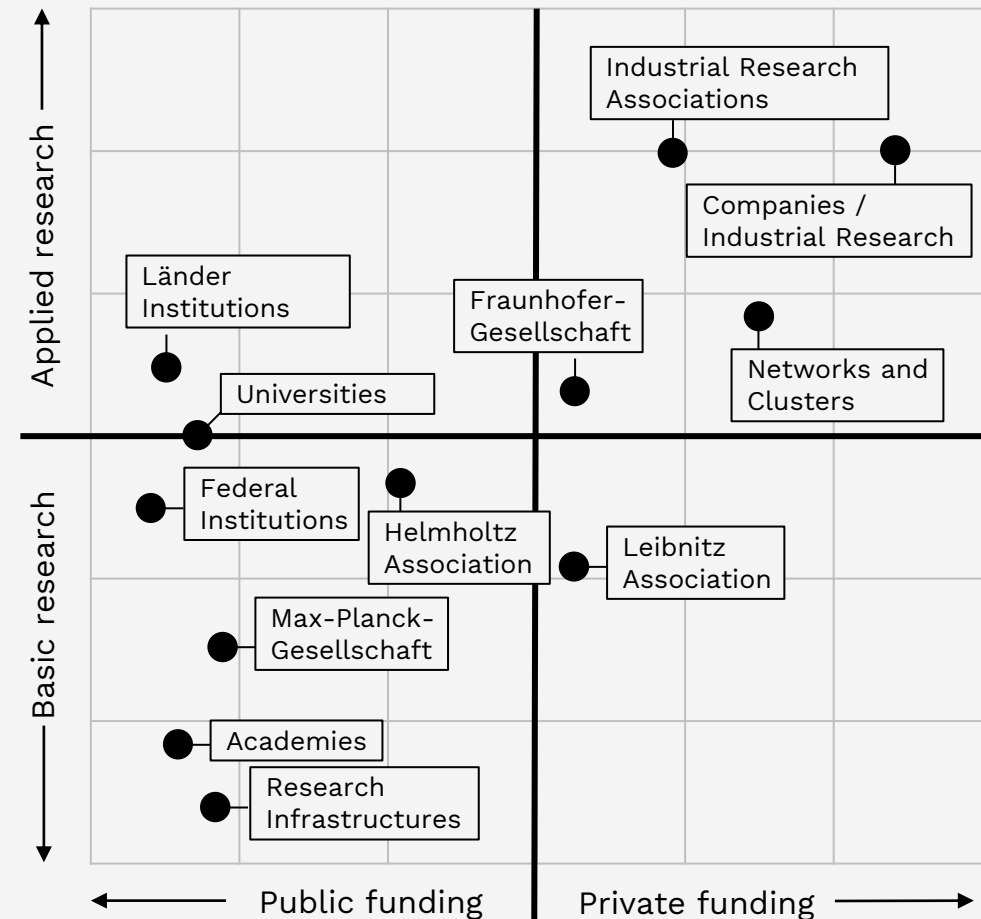
Acknowledging the need for coordinated action

The rising tide of data – nearly as many digital bits as there are stars in the universe.

11.02.2022   HeFDI Data Talks

4

https://www.businessprocessincubator.com/content/what-is-big-data/

Availability of research data with time

- Data being lost are estimated to increase by **17% in every** year after publication.

- Find a working e-mail address for the first, last, or corresponding author fell by **7% per year**.

- Overall, we only received **19.5%** of the requested data sets, and only 11% for articles published before 2000.

Missing data

As research articles age, the odds of their raw data being extant drop dramatically.

Data extant (assuming author responded)

Age of paper (years)
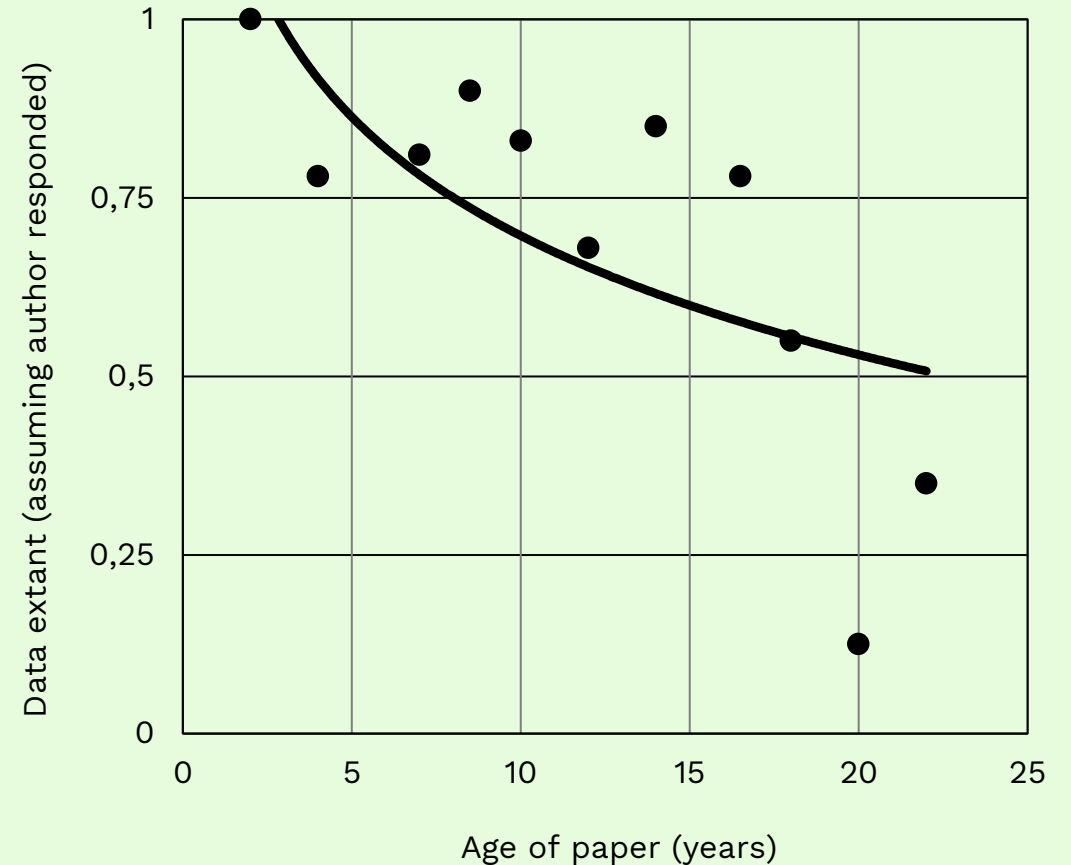
Forschungsdaten – for all and forever?

Das ungenutzte Potential, das in zahlreichen Forschungsdaten liegt, wollen wir effektiver für innovative Ideen nutzen. Den Zugang zu Forschungsdaten für öffentliche und private Forschung wollen wir mit einem Forschungsdatengesetz umfassend verbessern sowie vereinfachen und führen Forschungsklauseln ein. Open Access wollen wir als gemeinsamen Standard etablieren. Wir setzen uns für ein wissenschaftsfreundlicheres Urheberrecht ein. Die Nationale Forschungsdateninfrastruktur wollen wir weiterentwickeln und einen Europäischen Forschungsdatenraum vorantreiben. Datenteilung von vollständig anonymisierten und nicht personenbezogenen Daten für Forschung im öffentlichen Interesse wollen wir ermöglichen.

KOALITIONSVERTRAG 2021-2025 ZWISCHEN SPD, BÜNDNIS 90/DIE GRÜNEN UND FDP

MEHR FORTSCHRITT WAGEN

BÜNDNIS FÜR FREIHEIT, GERECHTIGKEIT UND NACHHALTIGKEIT

NFDI

Nationale Forschungsdaten Infrastruktur

The road towards NFDI

2011-2015:
Structured exploration
Basic recommendations
on how to adapt the
organisation of scientific
information infrastructures
in the digital turn

2016-2019
Realisation phase
Joint Science Minister Conference adapts
RfII recommendation; DFG is tasked with the
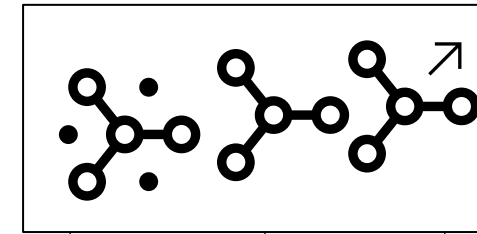funding process

2028 ff.

2022

2021

2020

**DFG
2019**

**GWK
2016-2018**

2016 ↗

Rat für
Informations
Infrastrukturen

LEISTUNG AUS VIELFALT

Empfehlungen zu Strukturen, Prozessen und Finanzierung
des Forschungsdatenmanagements in Deutschland

**RfII
2014**

**WR
2012**

**KII
2011**

Operational phase of 10 years
3 rounds of funding decisions
Founding of the NFDI e.V.

Parallel initiatives on the international level ↗

NFDI Facts and Figures

- Joint funding by Federal government and the *Länder*, initial period 2019-2028 **90 Mio EUR** per year

- Funding of up to **30 domain-related** "consortia" (science-driven process)

- Association "**NFDI e.V**" founded October 2020 to organise the data landscape

- Over **200** scientific **institutions** joined the NFDI association and support its goals

- Over **1000** professional **staff** expected

Structure of the NFDI

January 2022

19 Consortia

> 200 member organisations

www.nfdi.org

NFDI e.V. Association - Directorate -				
Data Plant	GHGA	NFDI4Biodiversity	NFDI4Cat	NFDI4Chem
NFDI4Culture	NFDI4Health	NFDI4Ing	KonsortSWD	BERD@NFDI
DAPHNE4NFDI	FAIRmat	MaRDI	NFDI4DataScience	NFDI4Earth
NFDI4Microbiota	NFDI4MatWerk	PUNCH4NFDI	Text+	...

What is NFDI good for?

NFDI funding helps to organise
the roles between data producers and
data consumers in science

↘

Organising the intermediary roles in NFDI

NFDI

Broker   Curator

Data archive   Clearing house

DATA "PRODUCER"   **INTERMEDIARY ROLES**   **DATA "CONSUMER" (END USER)**

Application developer   ...

Identity provider

Cross-cutting Topics Workshop Report
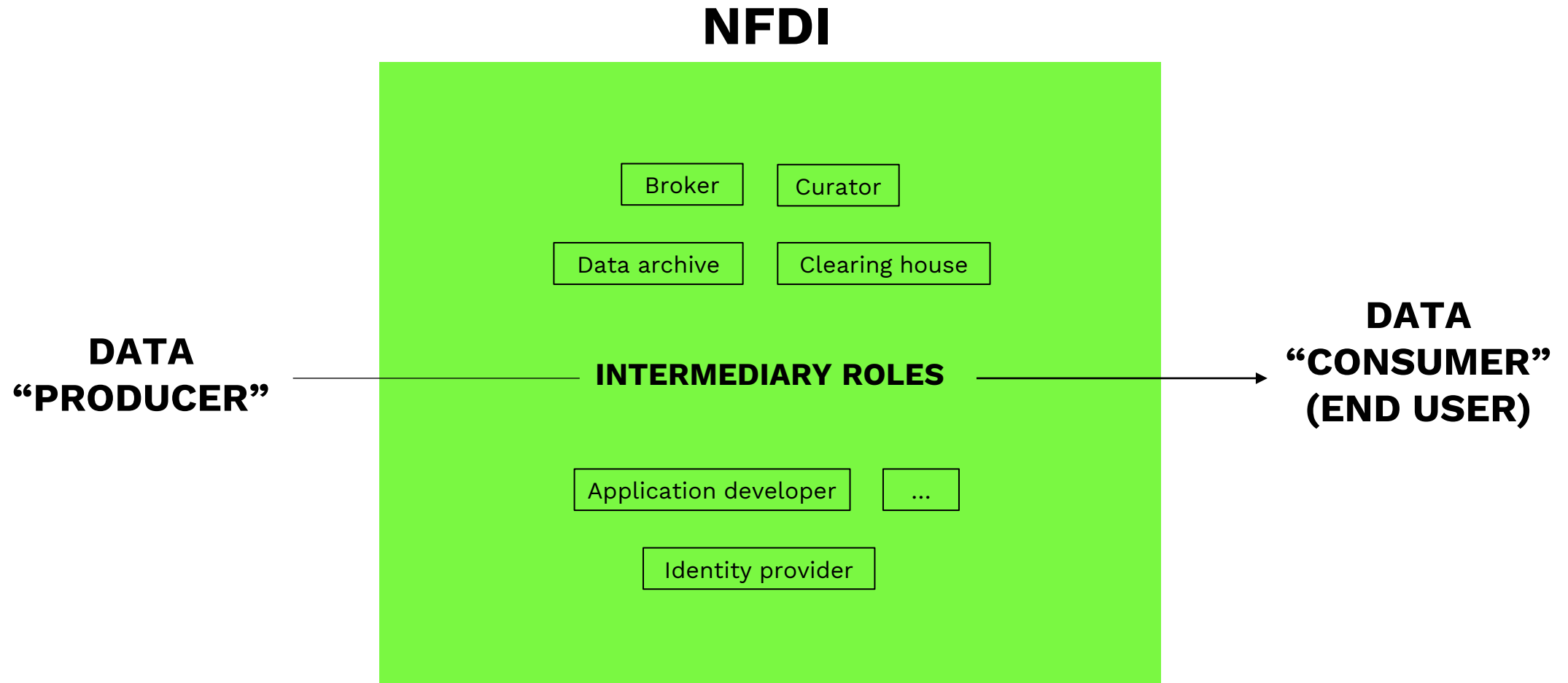
Cross-cutting
Topics
Workshop Report
11.03.2021
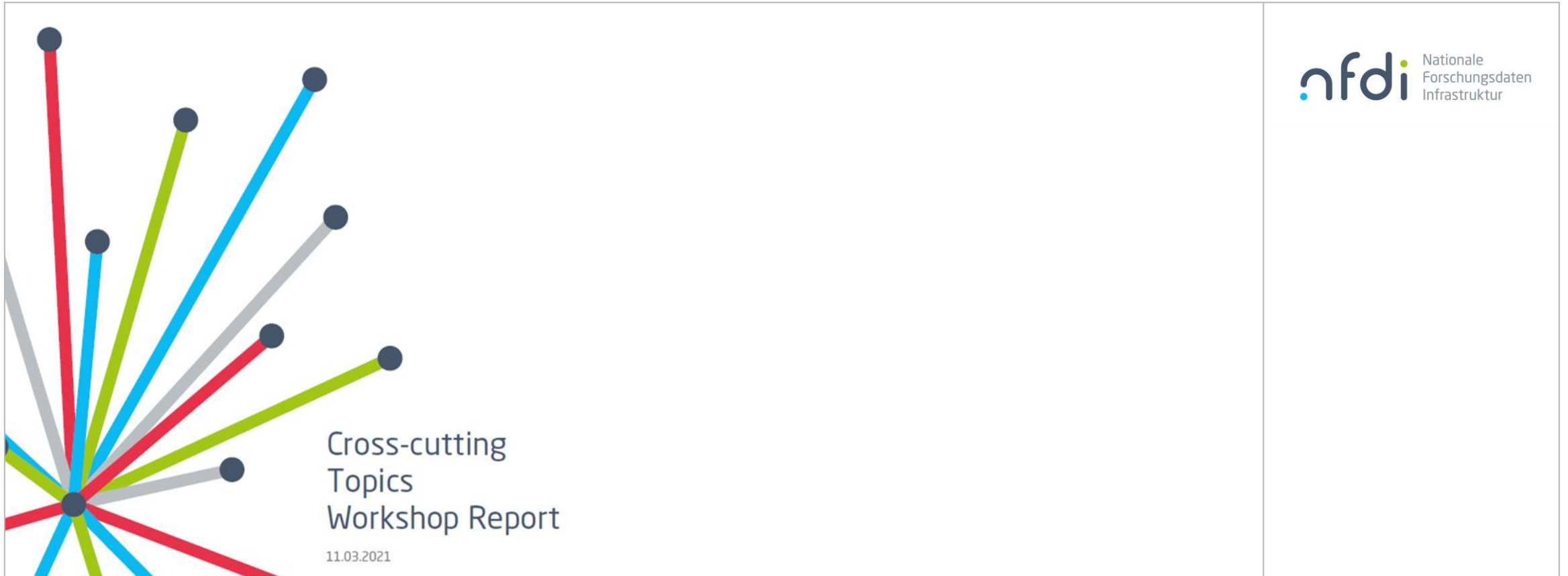
NFDI e.V. Sections

Association members join forces and create synergies

Common Infrastructures & Interoperability (Research Data Commons) ↘	(Meta)data, Terminologies, Provenience ↘	Training & Education ↘	Ethical, Legal & Social Aspects ↘
LEAD	**LEAD**	**LEAD**	**LEAD**
NFDI4Biodiversity (GFBio e.V.) & NFDI4Cat (Fraunhofer)	NFDI4Chem (TIB) & NFDI4Culture (HS Mainz)	NFDI4Ing (TU Darmstadt) & NFDI4Chem (RWTH Aachen)	NFDI4Culture (KIT) & NFDI4Health (Uni Göttingen)

Our Goal: Making Research Data FAIR

F	FINDABLE
A	ACCESSIBLE
I	INTEROPERABLE
R	REUSABLE
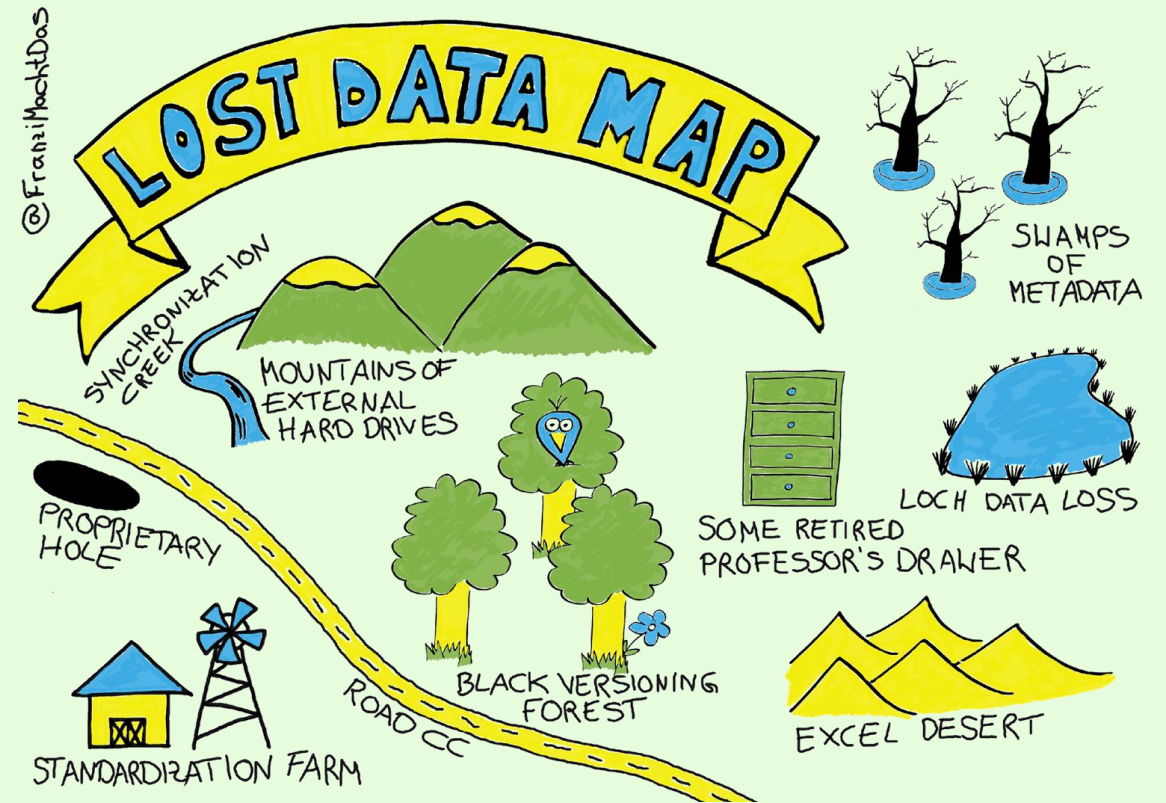
NFDI4Biodiversity

as an example

Our Motivation

"We are convinced that actors from science, politics and nature conservation need reliable data to make better contributions to the preservation of global biodiversity"

Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES)

Report published on May 6, 2019:
1 Million species threatened with extinction

ipbes
Science and Policy
for People and Nature

#GlobalAssessment   #IPBES7

Media Release: Nature's Dangerous Decline 'Unprecedented'; Species Extinction Rates 'Accelerating'

Media Release: Nature's Dangerous Decline 'Unprecedented'; Species Extinction Rates 'Accelerating'

www.ipbes.net   ↘

Joint services for environmental & biological data in Germany: A history

2011

DFG group* recommends a „National Data Service Center for environmental biological data"

2014

The „German Federation for Biological Data" (GFBio) is formed; 7.5 years DFG-funding

2016

Foundation of GFBio e.V. as legal entity to sustain the service portfolio

2018

Submission of new work programme to the National Research Data Infrastructure (NFDI)

2020

First 5-year funding phase granted

2021 ff.

Integration of new partners and technologies
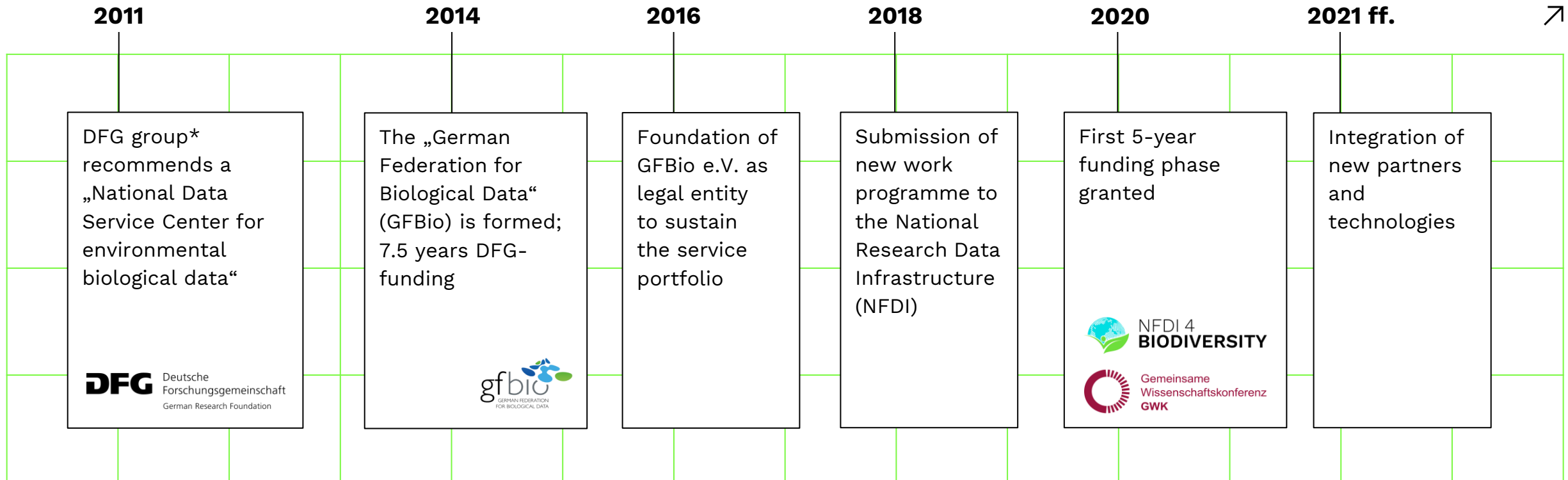
Facets of Biodiversity

Very specific data types – often combined with geospatial data. Time series, reference lists and taxonomies

species

genes

functions
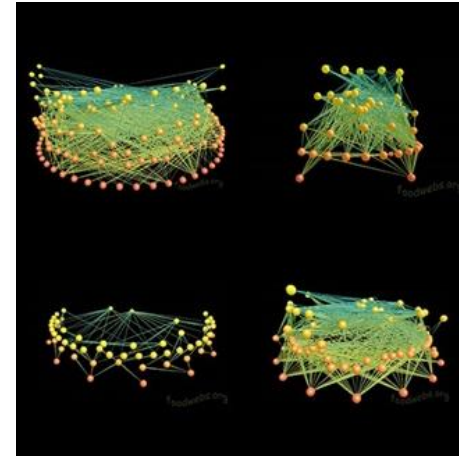
ecosystems

interactions

Facets of Data

distributions

state & federal agencies

ecosystem data

national parks

experiments

research institutes

occurrence data

research institutes,
associations, foundations,
citizen science

functional traits

research institutes

satellite data

research institutes &
agencies
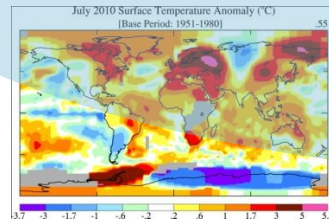
model output

research institutes
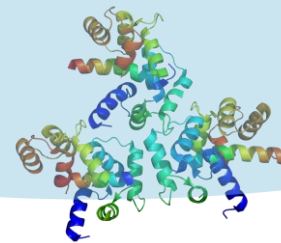
molecular data

research institutes

collection data

museums & collections

Adapted from Christian Wirth, iDiv

The NFDI4Biodiversity Consortium:
15 Co-Applicants

Legend:
- Data Center
- Infrastructure Provider
- Computer Science
- Biology / Env. Sciences
- Teaching / Training

The NFDI4Biodiversity Consortium:
>30 Participants

Academia			**Collection Datacenters**	
AWI	IfL	MPI-BGC	BGBM-DI	SMNS
BIOfid	IGB	SUB	MfN	ZFMKZMT
DNAqua	InfAI	Uni Göttingen	SGN	
Net	IÖR	Uni Leipzig		
HIFMB				

		AraGes Spinnen	**Gfl-Fische**
BSH	NP Bayerischer Wald	AraGes Spinnen	Gfl-Fische
HLNUG	NP Hunsrück	BUND	GfÖ
Kühn Institut	Staatl. Archive Bayern	DDA-Vögel	Naturgucker
LAU	Thünen Institut	GdO-Libellen	NetPhyD-Pflanzen
LfULG			

State Agencies   **Societies & Citizen science**

NFDI4Biodiversity Use Case Projects

01 eLTER	02 Plants - IPK	03 AMMOD Hub	04 DE Barcode of Life	05 Marine Life	06 Land use/cover
07 DNAquaNet	08 Naturgucker	09 Insekten Sachsen	10 NFDI4Agri	11 MultiBase, LA	12 NP Bayer. Wald
13 MultiBase, LA (2)	14 AlgaTerra	15 GdO - Libellen	16 Ara-Ges - Spinnen	17 NetPhyD	18 Gfl - Fische
19 Viz Tools	20 NP Hunsrück	21 MultiBase, LA (3)	22 iDiv PlantHub	23 ALA-DE	•••

AMMOD use case

5. base station for energy supply, weather recording and local data filtering

3. moth scanner

1. acoustic recorder

4. camera trap for detection of mammals

2. detector for volatile organic compounds

8. autonomous pollen sampler

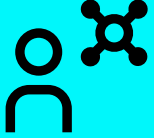7. automated Malaise trap for monitoring of insects

https://ammod.de/
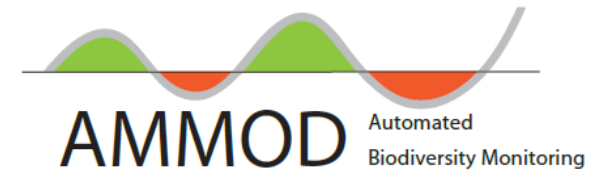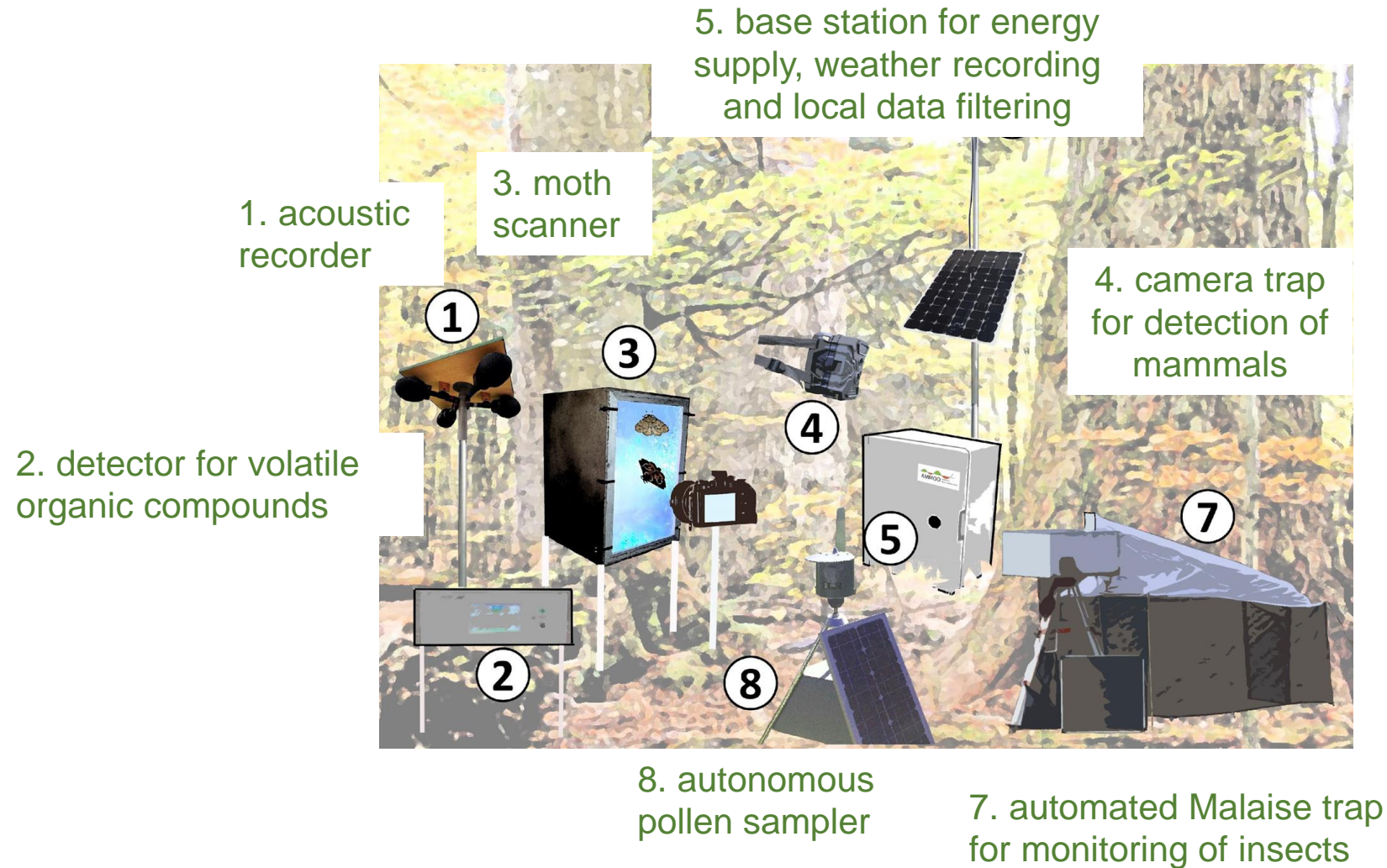
NFDI4Biodiversity Community Services

Consortium for Biodiversity, Ecology and Environmental Data

Services in NFDI4Biodiversity

With our experienced partners, we offer access to tried-and-tested tools for handling biodiversity and environmental data.

	Access to relevant data services from the domain
Front Office/Back Office Support for Research Data Management	
	Education and Training
Common Infrastructure (Research Data Commons)	

Data types and archives

Typical types of data our partners can handle:

- Environmental data (e.g. temperature, rainfall, salinity)

- Trait data (e.g. seed number and mass)

- Molecular data (e.g. sequences)

- Experimental and laboratory measurements

- Multimedia (photographs, audio, video), f.e. of observed specimens

- Orthophotos produced using a drone

- Digital surface models produced using a drone and assigned software
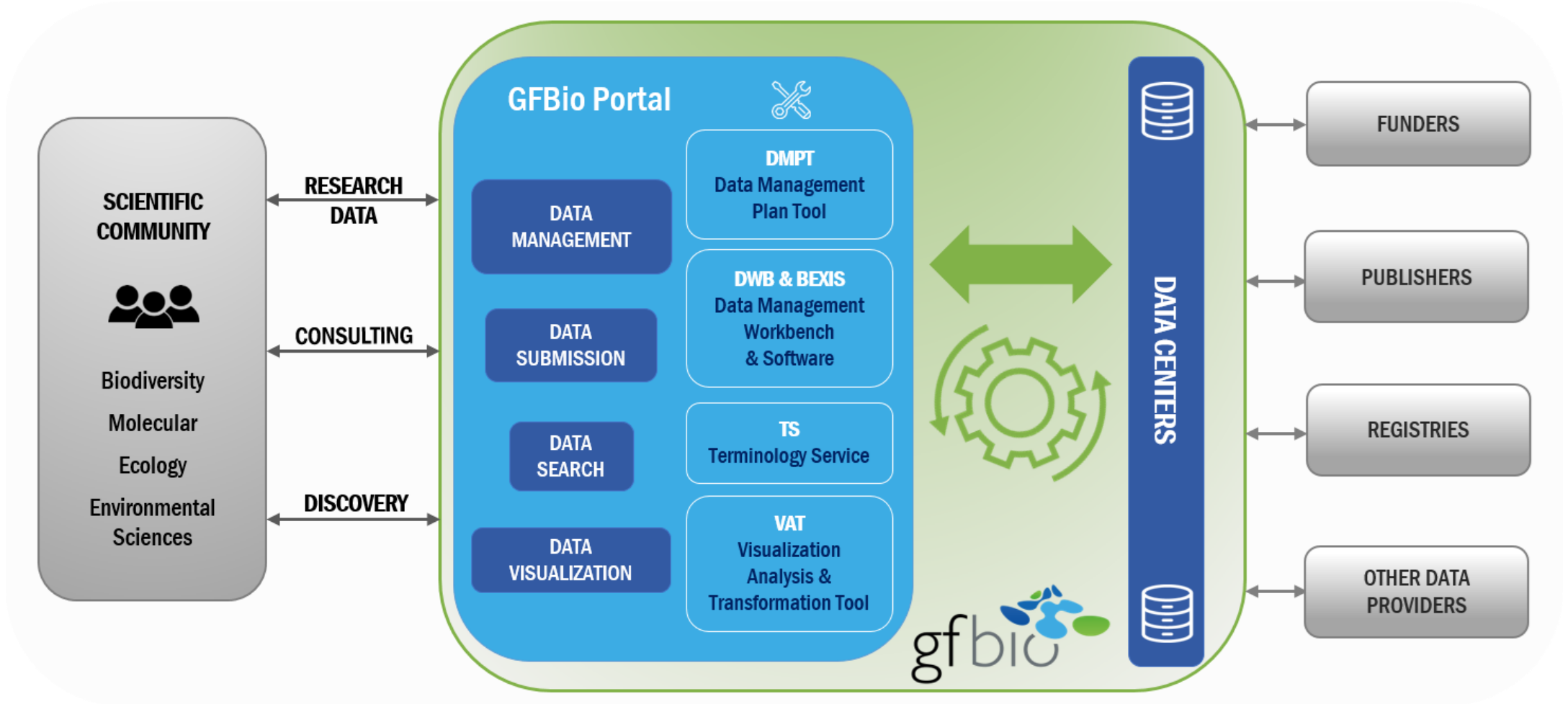
- Model code

- Statistics

Data Centers specialized on Nucleotide, Plant and Environmental Data
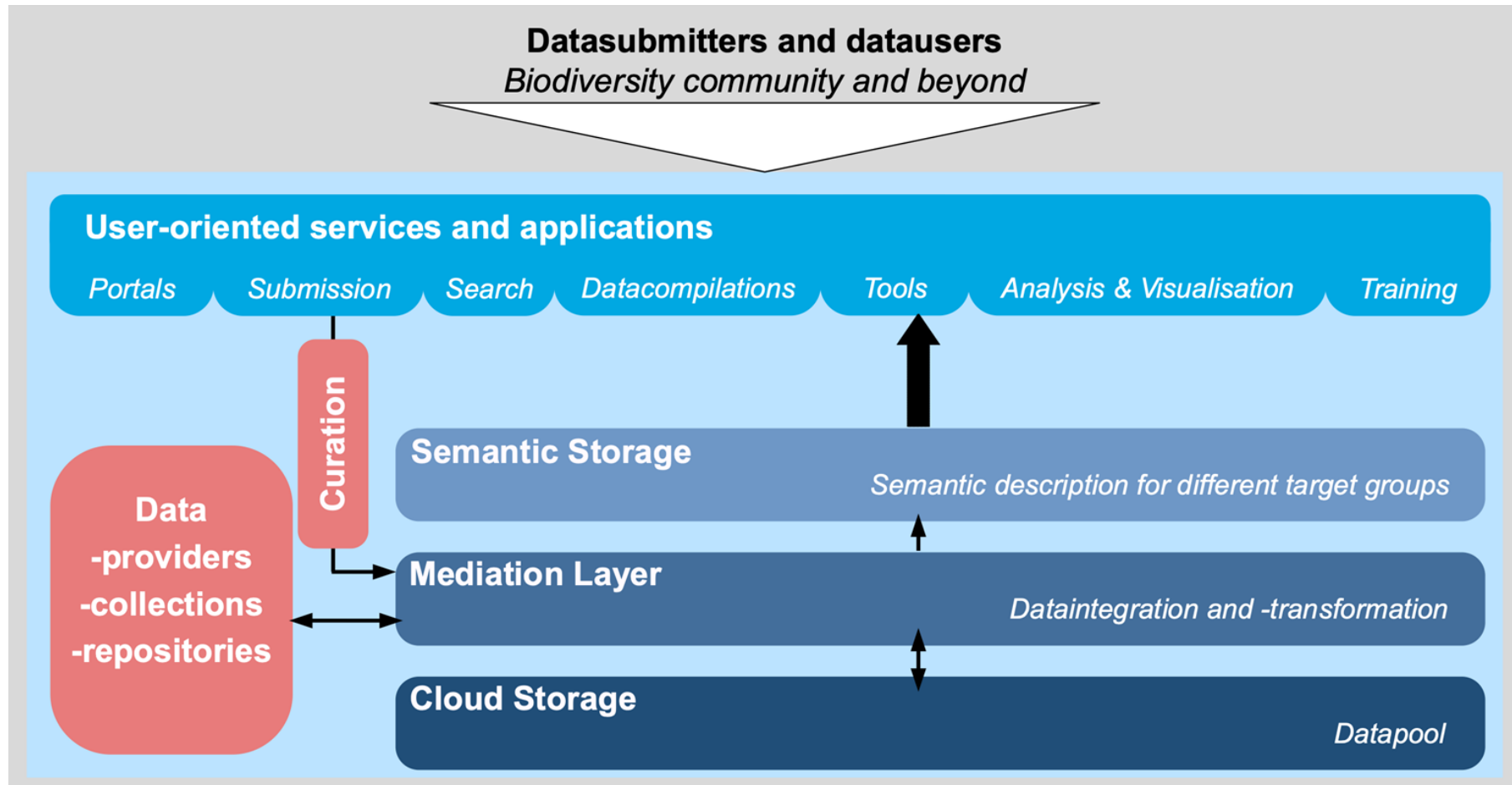
Data Centers at Natural Science Collections

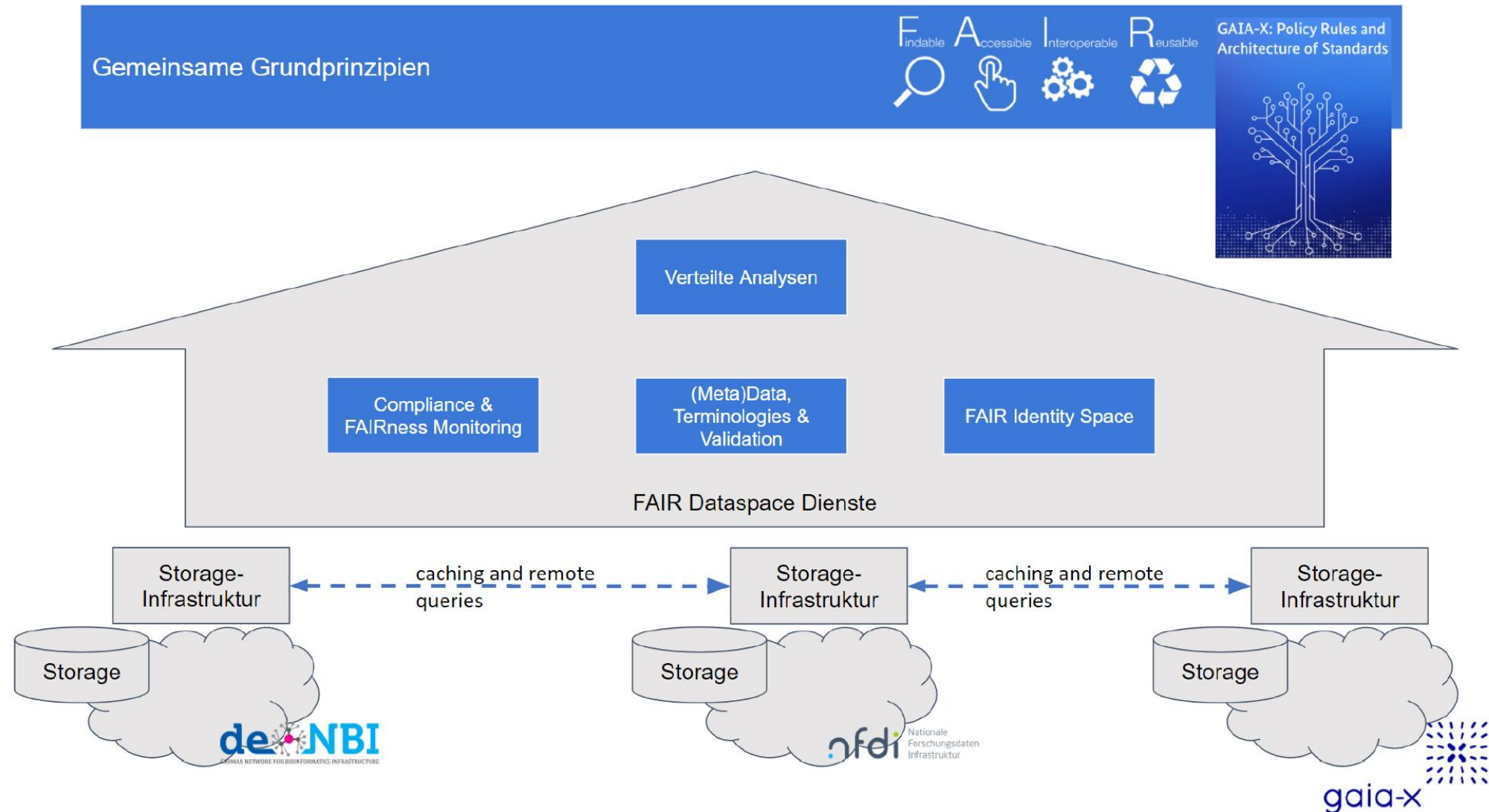# Goal: Joint delivery of services along the data life cycle

Next level technology: Moving services to the academic cloud
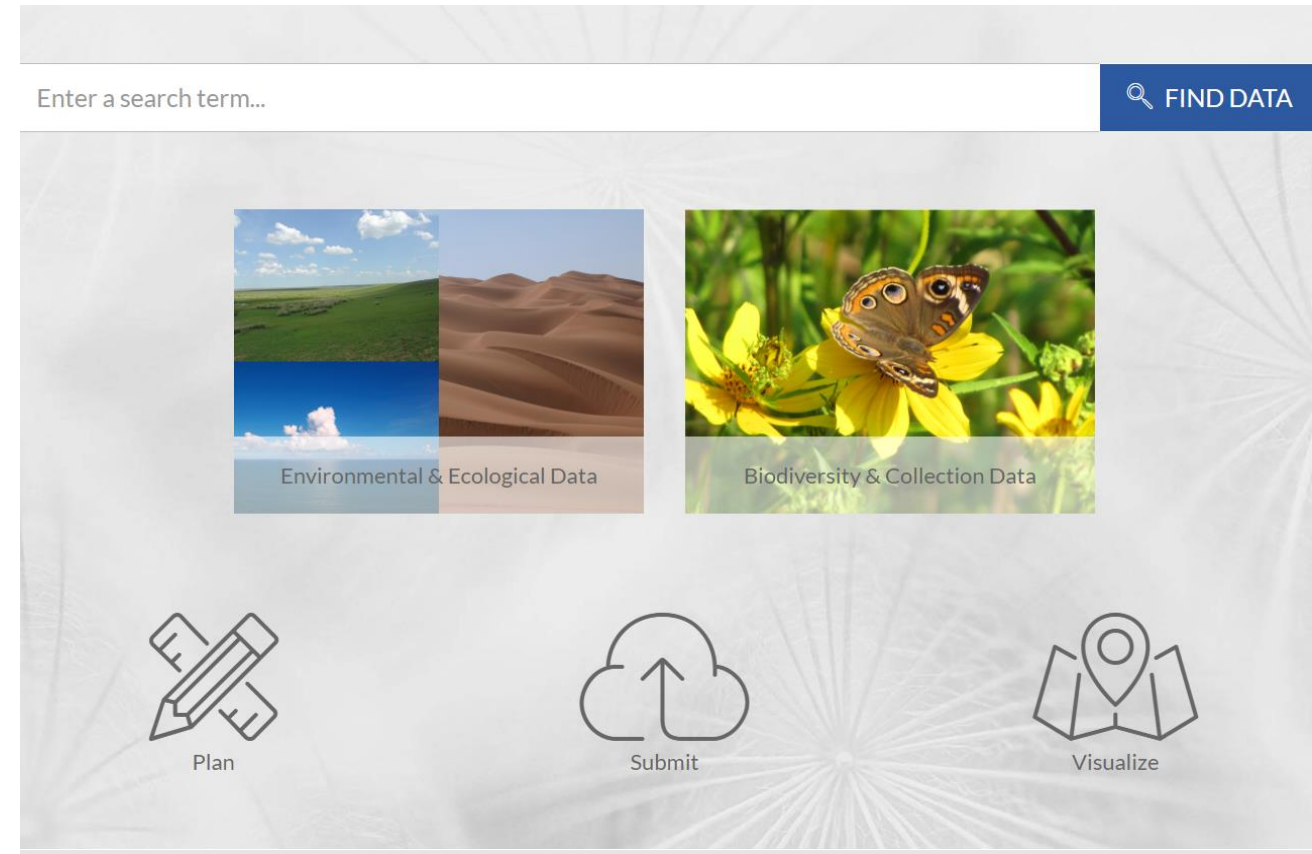## Section: Common infrastructure & interoperability

FAIR Data Space for Science and Economy

Abbildung 1: Schematische Architektur eines FAIR Data Space (vgl. AP3)

Research data services

A portfolio brought to NFDI4Biodiversity through the German Federation for Biological Data (GFBio e.V.)

Resources on Youtube

Data Management for Researchers [GFBio]

5 Videos • 21 Aufrufe • Zuletzt am 10.11.2021 aktualisiert

Data Visualization, Analysis and Transformation

5 Videos • 38 Aufrufe • Zuletzt am 07.12.2021 aktualisiert

Data Science 4 Ecologists in R

3 Videos • 96 Aufrufe • Zuletzt am 07.12.2021 aktualisiert

For practical support, please drop us a line!

Why?

https://youtu.be/GLrTnMa4lW8

NFDI 4 BIODIVERSITY

www.nfdi4biodiversity.org
@NFDI4Biodiv
#NFDI4Biodiv

Thank you – time for questions!