

Adapted Work Programme

as agreed by the SC on January 28th 2022

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Project months

Year 1	Year 2	Year 3	Year 4	Year 5
01 - Oct 2020	13 - Oct 2021	25 - Oct 2022	37 - Oct 2023	49 - Oct 2024
02 - Nov 2020	14 - Nov 2021	26 - Nov 2022	38 - Nov 2023	50 - Nov 2024
03 - Dec 2020	15 - Dec 2021	27 - Dec 2022	39 - Dec 2023	51 - Dec 2024
04 - Jan 2021	16 - Jan 2022	28 - Jan 2023	40 - Jan 2024	52 - Jan 2025
05 - Feb 2021	17 - Feb 2022	29 - Feb 2023	41 - Feb 2024	53 - Feb 2025
06 - Mar 2021	18 - Mar 2022	30 - Mar 2023	42 - Mar 2024	54 - Mar 2025
07 - Apr 2021	19 - Apr 2022	31 - Apr 2023	43 - Apr 2024	55 - Apr 2025
08 - May 2021	20 - May 2022	32 - May 2023	44 - May 2024	56 - May 2025
09 - June 2021	21 - June 2022	33 - June 2023	45 - June 2024	57 - June 2025
10 - July 2021	22 - July 2022	34 - July 2023	46 - July 2024	58 - July 2025
11 - Aug 2021	23 - Aug 2022	35 - Aug 2023	47 - Aug 2024	59 - Aug 2025
12 - Sept 2021	24 - Sept 2022	36 - Sept 2023	48 - Sept 2024	60 - Sept 2025

Introduction

The NFDI4Biodiversity work programme is built on six objectives: 1) Promoting research data management as an integral part of biodiversity research, 2) Enabling FAIRness of data, 3) Consolidating FAIRness with quality, 4) Embedding NFDI4biodiversity into the (inter)national landscape, 5) Addressing NFDI-wide cross-cutting topics and 6) Promoting collaborative governance, viability and sustainability of data infrastructure services and science.¹

At the heart of the work programme are 23 distinct use cases, which serve to integrate a substantial number of new partners and resources into a common infrastructure. In this, the partners can build on experiences from the previous GFBio project and other major infrastructure projects from the field. On the technical side, the main goal is to build a cloud-based service platform called “research data commons” (RDC) with an application layer for the users and several integration and storage layers for software and data. This involves quite massive efforts in terms of conceptualisation and re-programming of software.

The work programme is broken down into five task areas which cover different aspects of the joint infrastructure development: community building, networking, tool development, integration of tools and project coordination (see Fig. 1). Each task area has up to five distinctive measures, each with a set of milestones to structure the work.

¹ Glöckner et al. (2020), p. 5

TA1- Community engagement (2involve)

Lead: Prof. Dr. Aletta Bonn, Prof. Dr. Birgit Gemeinholzer, Dr. Mark Frenzel, Prof. Dr. Klaus Wimmers

TA1 Measure 1 - Use cases to engage biodiversity communities in mobilising and archiving existing and newly generated data

Lead: Prof. Dr. Aletta Bonn, Prof. Dr. Birgit Gemeinholzer, Dr. Mark Frenzel

Start date (Kick-off): 01.01.2021 (PM 04)

Measure 1 includes 23 use cases with various stakeholders of the biodiversity community in Germany, to raise awareness, create interfaces and organize interoperability between data resources.

As a reaction to the budget cuts, resources from the HR Pool and the centrally managed funds had to be reduced. Table 4.2.1 in the original grant proposal, including the estimated project months and the time frames for the individual use cases, is therefore void. In order to nevertheless provide support to all use cases, several strategies will be adopted: (1) identification of and concentration on essential tasks, (2) grouping of use cases with similar needs and identification of additional synergies and (3) in-kind contributions of the co applicants and the participants involved in the use cases will be increased where possible. The onboarding of new use cases or partners, which was an option in the original work plan, will not be pursued. In such cases, additional funding has to be obtained.

Original milestones 2019

Milestone	Milestone Description	Month
M11.1	Establishment of a science-society-policy advisory board with community representatives	4
M11.2	Start of thematic network with annual series of user community conference and 4 expert workshops series focusing on the needs of different communities (authorities, NGO's, natural history societies, research institutions,), in collaboration with use cases	9
	Expert Workshop 1	24
	Expert Workshop 2	36
	Expert Workshop 3	48
	Expert Workshop 4	60
M11.3	Ticket system for data support and data protection advice agreed and documented, established	24
M11.4	NFDI4Biodiversity strategy for use case support agreed and documented	36

M11.5	Field report and analysis published (preferably in peer reviewed journal)	60
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Adapted milestones 10/2020

Milestone	Milestone Description	Month
M11.1	<i>[Science-society-policy advisory board with community representatives established] => merged with M5.1.1 Governance</i>	12
M11.2	Kick-off thematic transdisciplinary network with authorities, NGO's, natural history societies, research institutions, in collaboration with use cases (includes a series of annual events, see below)	10
M11.3	Ticket system for data support and data protection advice agreed and documented, established	24
M11.4	NFDI4Biodiversity strategy for use case support agreed and documented	12
M11.5	Field report and analysis published (preferably in peer reviewed journal)	60

Comments 10/2020

M11.1 The science-society-policy advisory board was proposed to ensure the close collaboration with the societies, policy makers and scientists. Independent of budget restrictions, the milestone is merged with milestone 5.1.1 to ensure good overall governance.

M11.2 Establishing a viable transdisciplinary network within NFDI4Biodiversity is a core task to mobilize data and achieve cooperation across actors in biodiversity monitoring. This goal potentially reaches beyond the group of co-applicants and participants currently engaged in the NFDI4Biodiversity consortium. Originally, a series of public conferences plus four expert workshops (or "retreats") were planned per annum. The larger part of the event budget was foreseen to cover expenses for participants with weak institutional support. After budget cuts, part of the budget will be reserved to cover the essential invitations for one annual networking event and at least one workshop/retreat per year. We will seek to realize further networking events, potentially through synergies with events in the related communities and additional funding sources (to be explored as the project progresses). M11.4 will be addressed earlier as originally planned (independent of budget), as it provides the necessary framework to support the use cases efficiently and will aid in the identification of synergies between use cases.

2nd adaptation of milestones 01/2022

Milestone	Milestone Description	Start of work	Target month
M1.1.1	<i>[Science-society-policy advisory board with community representatives established] => merged with M5.1.1 Governance</i>	04	12
M1.1.2 COMPLETED	Kick-off thematic transdisciplinary network with authorities, NGO's, natural history societies, research institutions, in collaboration with use cases (includes a series of annual events)	04	10
M1.1.3	Ticket system for data support and data protection advice agreed and documented, established	13	24
M1.1.4 COMPLETED	NFDI4Biodiversity strategy for use case support agreed and documented	04	12
M1.1.5	Field report and analysis published (preferably in peer reviewed journal)	48	60

Comments 01/2022

There are no changes required compared to the 10/2020 version.

Interdependencies exist with TA3 and SIG2 Service Monitoring and SIG3 Training and Education. Since there is a large overlap in the people involved, coordination is given. For M1.2.4 coordination with TA4 is needed.

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TA1 Measure 2 - Support with tools/platforms for (early) mobilization of data and data analyses

Lead: Dr. Ivaylo Kostadinov, Prof. Dr. Birgitta König-Ries, Dr. Wolfgang Müller

Start date (Kick-off): 01.01.2022

Measure 2 provides direct technical support specifically for the use case partners in NFDI4Biodiversity network. It complements TA1 Measure 1.

Original milestones

Milestone	Milestone Description	Month
M1.2.1	Technical support with deployment of tools and platforms started, support by GFBio workbenches started	12
M1.2.2	Support workflows and knowledge sharing with TA3 M1-M2 established	24
M1.2.3	NFDI4Biodiversity strategy for RDM tool support in accordance with NFDI-RDC for science projects agreed and published	36
M1.2.4	NFDI4Biodiversity strategy for RDM tool and platform support in accordance with NFDI-RDC for independent research data web portals and citizen science monitoring projects agreed +published	48
M1.2.5	Field report and analysis published in peer-reviewed journal	60

Adapted milestones 10/2020

Milestone	Milestone Description	Month
M1.2.1	Technical support with deployment of tools and platforms started, support by GFBio workbenches started	24
M1.2.2	Support workflows and knowledge sharing with TA3 M1-M2 established	30
M1.2.3	NFDI4Biodiversity strategy for RDM tool support in accordance with NFDI-RDC for science projects agreed and published	36
M1.2.4	NFDI4Biodiversity strategy for RDM tool and platform support in accordance with NFDI-RDC for independent research data web portals and citizen science monitoring projects agreed +published	48

M1.2.5	Field report and analysis published (preferably in a peer-reviewed journal)	60
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Comments 10/2020

Milestone 1.2.1 is postponed, as NFDI4BioDiversity staff will supersede part of the GFBio project team in the Fall of 2021 (see TA5 M1). Milestone 1.2.2 is postponed in response to the adapted workprogramm of TA3.

2nd adaptation of milestones 01/2022

Milestone	Milestone Description	Start of work	Target Month
M1.2.1	Technical support with deployment of tools and platforms started, support by GFBio workbenches started and documented in Confluence	17	24
M1.2.2	Support workflows and knowledge sharing with TA3 M1-M2 established and documented in Confluence	20	30
M1.2.3	NFDI4Biodiversity strategy for RDM tool support in accordance with NFDI-RDC for science projects agreed and published	24	34
M1.2.4	NFDI4Biodiversity strategy for RDM tool and platform support in accordance with NFDI-RDC for independent research data web portals and citizen science monitoring projects agreed and published	28	48
M1.2.5	Field report and analysis submitted for publication (preferably in a peer-reviewed journal)	48	60

Comments 01/2022

There are no changes required compared to the 10/2020 version.

For M1.2.1, M1.2.2, M1.2.3 interdependencies exist with TA3, TA1M3, SIG2 Service Monitoring, and SIG3 Training and Education. Since there is a large overlap in the people involved, coordination is given. For M1.2.4 coordination with TA4 is needed.

TA1 Measure 3 - Front office/back office: Active Research Data Management (RDM) & data science support

Lead: Dr. Judith Weber, Dr. Dagmar Triebel

Start date (Kick-off): 01.01.2022 (the measure is active on lead level since PM 8)

In this measure, the successful GFBio front office/back office helpdesk model and ticket system will be extended and adapted to the new audience(s).

Original milestones

Milestone	Milestone Description	Month
M1.3.1	Back-office operational, ticket system unified and consortium trained	12
M1.3.2	Training workshops for front-office personnel at universities and institutes- Training 1	24
	Training workshops for front-office personnel at universities and institutes- Training 2	36
	Training workshops for front-office personnel at universities and institutes- Training 3	48
	Training workshops for front-office personnel at universities and institutes- Training 4	60
M1.3.3	Full integration with certification helpdesk (TA3 M2) established	24
M1.3.4	Front-office model established at several additional locations - Front office extended 1	48
	Front-office model established at several additional locations - Front office extended 1	60

Adapted milestones 10/2020

Milestone	Milestone Description	Month
M1.3.1	Back-office operational, ticket system unified and consortium trained	18
M1.3.2	Training workshops for front-office personnel at universities and institutes- Training 1	20
	Training workshops for front-office personnel at universities and institutes- Training 2	40

	Training workshops for front-office personnel at universities and institutes- Training 3	60
M1.3.3	Full integration with certification helpdesk (TA3 M2) established	24
M1.3.4	Front-office model established at several additional locations	60

Comments 10/2020

M1.3.1 is postponed to M18, as NFDI4Biodiversity staff will supersede part of the GFBio project team in the Fall of 2021 (see TA5 M1).

M1.3.2 and M1.3.4 will concentrate on establishing the front-office model via personal communication and training during M20-M60. The training materials will be collected and provided for self-training. Extending and improving the network will also rely on the work of the Helpdesk and cross-cutting NFDI training events. The number of training workshops was reduced to three.

2nd adaptation of milestones 01/2022

Milestone	Milestone Description	Start of work	Month
M1.3.1	Back-office operational, ticket system unified and consortium trained	6	18
M1.3.2	Training workshops for front-office personnel at universities and institutes- Training 1	15	21
	Training workshops for front-office personnel at universities and institutes- Training 2	21	40
	Training workshops for front-office personnel at universities and institutes- Training 3	40	60
M1.3.3	Full integration with certification helpdesk (TA3 M2) established	15	24
M1.3.4	Front-office model established at several additional locations	30	60

Comments 01/2022

Please explain changes

Training workshops for front office personnel at universities and institutes will be tested by the cooperation with FEdA, where FEdA and Qualiservice personnel will be introduced to the helpdesk and integrated in the support workflow. Training workshop 1 will be pushed to Month 21 to allow for suitable planning.

M1.3.4, front-office model established at several additional locations, will be actively pursued once the consortium has been fully integrated into the helpdesk and the services and data center support has been implemented routinely also for

new partners (not GFBio members).

Please explain interdependencies with other measures/milestones

The training for the consortium will concentrate first on the data center and data & service provider groups as defined in TA 3.3, the training will be held together with TA3 in project months 16 - 18.

Integration of the certification helpdesk (M1.3.3) is done in close cooperation with TA3.2 (already in progress). The milestone 3.2.1. Is defined as “certification helpdesk running” and is due in PM 18 according to the 2nd adaptation of milestones. As the implementation and full integration will be done hand in hand, M1.3.3 might be moved up to PM 18.

TA1 Measure 4 - Education and training

Lead: Dr. Ortrun Brand, Prof. Dr. Thomas Kneib

Start date (Kick-off): 08.02.22

The goal of this measure is to support education and training within NFDI4Biodiversity. This includes teaching of FAIR research data management according to the FAIR4S framework of the EOSC as a core topic to be integrated in the undergraduate and graduate curricula of biodiversity-related degrees at German universities. In addition, general aspects such as regularity conditions or statistical data analysis are considered as well.

Original milestones

Milestone	Milestone Description	Month
M1.4.1	Creation of training datasets and teaching videos	12
M1.4.2	Design of case studies in collaboration with other NFDIs and TA1 M1 use cases	24
M1.4.3	First case studies are incorporated into university teaching	36
M1.4.4	Outreach to multiplier communities established	48
M1.4.5	Revision of case studies based on first practical experiences	60

Adapted milestones 10/2020

Milestone	Milestone Description	Month
M1.4.1	First training datasets and teaching videos available	24
M1.4.2	Design of case studies in collaboration with other NFDIs and TA1 M1 use cases	30
M1.4.3	First case studies are incorporated into university teaching	42
M1.4.4	Outreach to multiplier communities established	48
M1.4.5	Revision of case studies based on first practical experiences	60

Comments 10/2020

As teaching is a fundamental part of the cultural change aspired by NFDI4Biodiversity, all milestones will be addressed. However, due to the

budget cuts, they will be reduced and M1.4.1-M1.4.3 will be postponed.

2nd adaptation of milestones 01/2022

Milestone	Milestone Description	Start of work	Month
M1.4.1	First training datasets and teaching videos available	14	24
M1.4.2	Design of case studies in collaboration with other NFDIs and TA1 M1 use cases	15	30
M1.4.3	First case studies are incorporated into university teaching	24	42
M1.4.4	Outreach to multiplier communities established	24	48
M1.4.5	Revision of case studies based on first practical experiences	48	60

Comments 01/2022

Please explain changes

First teaching videos on data processing and analysis using the R tidyverse are available now and will be uploaded regularly. First lectures for graduate and undergraduate curricula of biodiversity-related degrees at German universities have been conducted. Furthermore, the workshop “Rechtsfragen I” was conducted based on User Stories to support the partners in terms of legal aspects.

Please explain interdependencies with other measures/milestones

The design of case studies (M1.4.2) is currently encouraged by the feedback of the use case partner (launch meetings TA1 M1). Further, lectures and materials for graduate and undergraduate curricula of biodiversity-related degrees will be developed based on Train-the-Trainer concepts and activities in the section EduTrain.

TA1 Measure 5 - Regular quality surveys, user feedback, quality management, reputation systems

Lead: Maria Meister, Dr. Mark Frenzel

Start date (Kick-off): PM 14 (Nov 2021)

In this measure, regular quality surveys will be conducted and user feedback collected.

Original milestones

Milestone	Milestone Description	Month
M1.5.1	Instant surveys for user satisfaction implemented (based on preliminary work in GFBio)	6
M1.5.2	Service quality management strategy implemented	12
M1.5.3	Surveys for community demands and cultural change implemented	18
M1.5.4	Common concept of credit and reputation system discussed	36
M1.5.5	Results of survey activities published	54

Adapted milestones 10/2020

Milestone	Milestone Description	Month
M1.5.1	Instant surveys for user satisfaction implemented (based on preliminary work in GFBio)	12
M1.5.2	Minimal service quality management strategy implemented	18
M1.5.3	Surveys for community demands and cultural change implemented	24
M1.5.4	<i>Removed (budget cuts)</i>	
M1.5.5	Results of survey activities published	54

Comments 10/2020

M1.5.2. will deploy a minimal concept for Service Quality Management, which will be improved and extended on-demand.

M1.5.4 is crucial for NFDI as a whole and therefore should be addressed at inter-consortium level; it will be covered by activities of TA2M1.

M1.5.1-1.5.3 were postponed by six months, as NFDI4Biodiversity staff

supersedes part of the GFBio project team in the Fall of 2021 (see TA5 M1).

2nd adaptation of milestones 01/2022

Milestone	Milestone Description	Start of work	Month
M1.5.1	Instant surveys for user satisfaction implemented (based on preliminary work in GFBio)	4	12
M1.5.2	Minimal service quality management strategy implemented	17	24
M1.5.3	Surveys for community demands and cultural change implemented	25	29
M1.5.4	<i>Removed (budget cuts)</i>		
M1.5.5	Results of survey activities published	48	54

Comments 01/2022

Please explain changes

The milestones M1.5.2 is postponed by 6 months due to time and personnel dependencies with the measures involved.

In order to prepare the work on this milestone (respectively the conception of a service quality strategy) an is- analysis of current practises at the partner organizations and in the GFBio project was initiated, the evaluation of which was carried out in Q4 /21.

Please explain interdependencies with other measures/milestones

The design of the minimum service strategy which has to be implemented by M1.5.2 is being undertaken by the SIG Service Monitoring, which will begin its work in the spring of 2022. Another key component of the service monitoring will be the area of training that is currently being developed. Both of these developments are essential before the implementation of the minimum service strategy can occur.

TA2 - National and international networking (2connect)

Lead: Anton Güntsch, Prof. Dr. Ramin Yahypour, Prof. Dr. Jens Stoye

Task area 2 is concerned with the coordination of activities in the fields of standardisation and interoperability at national (NFDI) and international level. Essentially, it must be ensured that NFDI4Biodiversity identifies relevant resources and interfaces as well as cooperation opportunities and contributes to the creation of overarching infrastructures. The revised work plan will build more strongly on existing activities of project participants, which will have to focus more attention on NFDI (for example in international standardisation committees). However, if funding of specific activities (e.g. service catalogue, required ratifications) will still be necessary. These activities will be taken out of the workplan and applied for separately at a later project period, in a suitable manner.

TA2 Measure 1 - Collaboration with related NFDI consortia

Lead: Anton Güntsch, Prof. Dr. Ramin Yahypour

Start date (Kick-off): 01.01.2021 (PM 04)

Original work plan

Milestone	Milestone Description	Month
M2.1.1	Common requirements for core services across NFDI consortia identified	12
M2.1.2	Providing common use-cases for interoperability	24
M2.1.3	Common data models identified and standardized	36
M2.1.4	Requirements for common services across consortia filed	48
M2.1.5	Implementation of cross-consortia services within NFDI RDC finished	60

Adapted milestones 10/2020

Milestone	Milestone Description	Month
M2.1.1	Common requirements for core services across NFDI consortia identified	12
M2.1.2	Removed (budget cuts)	
M2.1.3	Common data models identified and standardized	26
M2.1.4	Requirements for common services across consortia filed	48
M2.1.5	Implementation of cross-consortia services within NFDI RDC finished	60

Comments 10/2020

The original work plan was to develop, in cooperation with other NFDI consortia, use cases to demonstrate interoperability between data infrastructures and calibrate the methods used. This approach is now being replaced by a focus on existing use cases of task area 1 and the requirements for interoperability with multidisciplinary resources that are to some extent contained therein.

2nd adaptation of milestones 01/2022

Milestone	Milestone Description	Start of work	Month
M2.1.1 COMPLETED	Shaping participation of the consortium in NFDI [was: Common requirements for core services across NFDI consortia identified]	08	12
M2.1.2	Removed (budget cuts)		
M2.1.3	Common data models identified and standardized		26
M2.1.4	Requirements for common services across consortia filed		48
M2.1.3	Specification of cross-cutting services with NFDI4Biodiversity involvement	13	30
M2.1.5	Implementation of cross-consortia services within NFDI RDC finished		60
M2.1.4	Report on available cross-cutting services with NFDI4Biodiversity involvement.	37	60

Comments 01/2022

The original work plan still reflected a somewhat vague view that NFDI4Biodiversity would have to coordinate bilaterally with other NFDI consortia on common implementations and standards. With the formation of the different sections, the topic is now structured across NFDIs, so the work programme and milestones need to be adjusted accordingly.

We have therefore replaced M2.1.4 and M2.1.4 with a new milestone (M2.1.3) providing a compilation of cross-cutting services which will be developed and/or provided with active involvement of NFDI4Biodiversity. In a final report (M2.1.4, M60), we will document cross-cutting services with NFDI4Biodiversity involvement which have been successfully developed and deployed.

Please explain interdependencies with other measures/milestones

Both milestones are informed by dedicated **Resource Provider Workshops**(there will be a series of workshops initiated by task area 4 measure 5 , task area 2 measure 1 and task area 3).

TA2 Measure 2 - Context with international services & developments

Lead: Anton Güntsch, Dr. Mark Frenzel

Start date (Kick-off): 01.01.2021 (PM 04)

Original work plan

Milestone	Milestone Description	Month
M2.2.1 COMPLETED	First strategic report on international involvement completed	12
M2.2.2	NFDI4Biodiversity Open Registration System up and running and NFDI4Biodiversity services registered	24
M2.2.3	2nd strategic report on international involvement completed	36
M2.2.4	NFDI4Biodiversity Open Registration System fully operational and accessible via API	48
M2.2.5	Data/service Use Agreements (DUAs) signed	60

Adapted Milestones 10/2020

Milestone	Milestone Description	Month
M2.2.1 COMPLETED	First strategic report on international involvement completed	12
M2.2.2	Removed (budget cuts)	
M2.2.3	2nd strategic report on international involvement completed	36
M2.2.4	Removed (budget cuts)	
M2.2.5	Data/service Use Agreements (DUAs) signed	60

Comments 10/2020

As part of Measure 2, it was planned that contributions to international working groups would be strategically coordinated and supported by the project. This approach will now be dropped and must be covered by the existing activities of the NFDI4Biodiversity partners. If specific activities (e.g. international workshops) will be necessary in the course of the project, the required funds will be requested separately.

The planned work on the creation of a service catalogue for the

documentation of external services developed and required in NFDI4Biodiversity will be dropped. Instead, we trust that a system will be provided in the next few years as part of other initiatives that can be used by NFDI4Biodiversity. Promising existing approaches are the de.NBI Service Catalogue (<https://www.denbi.de/services>) and BioCatalogue (<https://www.biocatalogue.org/>) for example. If this will not be the case, a separate project proposal can be considered for a later project period.

2nd adaptation of milestones 01/2022

Milestone	Milestone Description	Start of work	Month
M2.2.1 COMPLETED	First strategic report on international involvement completed	1	12
M2.2.2	<i>Removed (budget cuts)</i>		
M2.2.3	2nd strategic report on international involvement completed	13	29
M2.2.4	<i>Removed (budget cuts)</i>		
M2.2.5	Data/service Use Agreements (DUAs) signed	25	60

Comments 11/2021

Please explain changes

The work plan does not need to be changed.

Please explain interdependencies with other measures/milestones

The activities can be carried out relatively independently of other tasks. However, they are based on interactions with the Steering Committee, the SIG Strategy and the cross-community activities within the NFDI4Biodiversity Association. These interactions are continuous and need not be reflected in the structuring of the milestones.

TA2 Measure 3 - Engagement in European and international standardisation activities

Lead: Dr. Lars Möller, Dr. Janine Felden

Start date (Kick-off): 11.02.2022

Original work plan

Milestone	Milestone Description	Month
M2.3.1	Standards landscape analysis draft circulated	12
M2.3.2	Standards landscape analysis published in peer reviewed journal	24
M2.3.3	Standards assessment and calibration documented on NFDI4Biodiversity communication platform and shared with other NFDI consortia	42
M2.3.4	Ratification process started	42
M2.3.5	Ratification completed and standards documented	60

Adapted milestones 10/2020

Milestone	Milestone Description	Month
M2.3.1	<i>Removed (budget cuts)</i>	
M2.3.2	<i>Removed (budget cuts)</i>	
M2.3.3	Standards assessment and calibration documented on NFDI4Biodiversity communication platform and shared with other NFDI consortia	42
M2.3.4	<i>Removed (budget cuts)</i>	
M2.3.5	<i>Removed (budget cuts)</i>	

Comments 10/2020

The planned “landscape analysis” on relevant standards and best practices will not be carried out. Instead, existing studies from recent years will be brought together and documented in a “meta analysis”. In addition, the project will not conduct its own standards ratification activities. If necessary, separate funding will have to be raised.

2nd adaptation of milestones 01/2022

Milestone	Milestone Description	Start of work	Month
M2.3.1	<i>Removed (budget cuts)</i>		
M2.3.2	<i>Removed (budget cuts)</i>		
M2.3.3	Identify and document priority standards with focus on the general convergence goals of the consortium and its potential for trans-disciplinarity.	17 (02/2022)	42
M2.3.4	<i>Removed (budget cuts)</i>		
M2.3.5	<i>Removed (budget cuts)</i>		
M2.3.6	Compilation of relevant metadata standards with contributions from the consortium	17 (02/2022)	29

Comments 01/2022

Please explain changes

Instead of focusing on time-consuming landscape analyses, which by nature tend to become outdated quickly, the TA and M3 leads decided to focus on some promising standardisation efforts in the community in terms of e.g. metadata, services, metrics and API harmonisation. (12/2021)

Introduced a new milestone to address the requirement to explicitly list the consortium's contributions to metadata and RDM standards in the reporting. (01/2022)

TA3 - Long-term data, tools and service preservation, certification (2consolidate)

Lead: Prof. Dr. Birgitta König-Ries, Dr. Dagmar Triebel

The main goal of TA3 is to consolidate German data and service infrastructures to make them fit-for-use, sustainable and compliant for the Research Data Commons of TA4. Our approach to shorten the work programme is to find measures, which are not directly related to the main goal, or appropriate to be shortened in their amount of work or could be shifted to other initiatives (e.g., to be financially supported by other funding possibilities).

TA3 Measure 1: Identification and description of the current and emerging technical ecosystem in biodiversity research

Lead: Dr. Uwe Scholz, Prof. Dr. Ramin Yahyapour

Start date (Kick-off): 01-JAN-2021 (PM04)

Original work plan

Milestone	Milestone Description	Month
M3.1.1	NFDI4Biodiversity attribute-value concept for tool documentation established	12
M3.1.2	Training events established together with TA1 M3, TA3 M2 und TA1 M4 and other consortia; a first set of training material available	24
M3.1.3	NFDI4Biodiversity schema for three-fold documentation revised, cooperation with other NFDI consortia and information scientists/ linguistic support started	36
M3.1.4	Knowledge base extension to Jupyter framework adapted and communication platform established together with TA1 M4	48
M3.1.5	Field report and analysis published in peer reviewed journal	60

Adapted milestones 10/2020

Milestone	Milestone Description	Month
M3.1.1	<i>Removed (budget cuts)</i>	
M3.1.2	Training events established together with TA1 M3, TA3 M2 und TA1 M4 and other consortia	12
M3.1.3	NFDI4Biodiversity schema for a knowledge base with documentation “on demand” revised, cooperation with other NFDI consortia and information scientists/ linguistic support started	36
M3.1.4	<i>Removed (budget cuts)</i>	
M3.1.5	Field report and analysis published (preferably in peer reviewed journal)	60

Comments 10/2020

The original plan was to make a comprehensive and structured landscape analysis of tools and services by using a semantic approach for structured documentation. This is very challenging. Now, we decided to change the approach and set up a demand-driven knowledge base without the claim on completeness and high-level structure. Knowledge base extension to the Jupyter framework is deleted (M3.1.4).

The minimal viable product to be realised is a collection of structured documentations of NFDI4Biodiversity core products, tools and services. Thus, the prioritization lies with the products provided by the NFDI4Biodiversity partners. The documentations will be done on demand and in cooperation with the tool or service providers among the partners and participants. The descriptions will be designed in a way that is adequate to the target user community of the tools and services (i.e., one or more than one of the three target groups), that means either written in a clear and simple language for non-specialists (English or German) or in a discipline-specific expert language (adapted to the requirements of IT specialists or of biodiversity researchers). All tools and services will be categorized according to agreed ontologies and following a documentation schema similar to that in the original proposal.

2nd adaptation of milestones 01/2022

Milestone	Milestone Description	Start of work (month)	Month
M3.1.1	<i>Removed (budget cuts)</i>		

M3.1.2	Training events established together with TA1 M2, TA1 M3, TA3 M2 und TA1 M4 and other consortia	13 (OCT - 2021)	30
M3.1.3	NFDI4Biodiversity schema for a knowledge base with documentation “on demand” revised, cooperation with other NFDI consortia and information scientists/ linguistic support started	20 (MAY - 2022)	36
M3.1.4	<i>Removed (budget cuts)</i>		
M3.1.5	Field report and analysis submitted (preferably in peer reviewed journal, e.g https://f1000research.com)	37 (OCT - 2023)	48

Comments 01/2022

Please explain changes

- M3.1.2: This milestone is synchronised with TA1 M1, TA1 M3 and TA1 M4.

Please explain interdependencies with other measures/milestones

- A synchronisation with TA1 is essential. To achieve this, an agreement has been made with Daniel Tschink (NFDI4Biodiversity Training Coordinator). The current idea is to contribute to the TA1 M4 planned GfÖ Winterschool (responsible Jens Nieschulze, Göttingen).
- M3.1.3: Furthermore, collaboration with other NFDI consortia: e.g. TEXT+ and/or with NFDI4Biodiversity partners: e.g. BIOfid
- M3.1.3: Additionally, the usability of existing services like bioschemas.org and/or schemas of bio.tools should be analyzed.

TA3 Measure 2: Profiling biodiversity tools, technical services and data centers, adopting them as NFDI-RDC-recommended and guide them towards certification

Lead: Prof. Dr. Ramin Yahyapour, Dr. Uwe Scholz

Start date (Kick-off): 01.01.2021 (PM04)

This measure will give support to users to professionalize their tools and guide them to be NFDI-RDC compliant. It guides users in the biodiversity and ecological domain towards certification of their software tools, of technical services and of domain-specific data repositories and will build heavily on the experiences gained by the GFBio data centers in the Core Trust Seal certification process. This is a core task and related to the overall objectives on sustainable (re)use of tools and services without great potential to reduce the costs.

Original work plan

Milestone	Milestone Description	Month
M3.2.1	Test and certification helpdesk running	12
M3.2.2	Workshop to promote professional profiling, documentation and certification of tools, services and data repositories, together with other NFDI consortia; focus on tools to facilitate the generation of FAIR data	24
M3.2.3	Cooperation with several national, European and international platforms/registries for tools and NFDI-RDC established	36
M3.2.4	Workshop to promote tools and workspaces for managing the whole scientific workflow/ reproducibility of scientific results; together with TA4	48
M3.2.5	Field report and analysis published	60

Adapted milestones 10/2020

Milestone	Milestone Description	Month
M3.2.1	Test and certification helpdesk running	12
M3.2.2	Workshop to promote professional profiling, documentation and certification of tools, services and data repositories,	30

	together with other NFDI consortia; focus on tools to facilitate the generation of FAIR data	
M3.2.3	Cooperation with other NFDI consortia and further additional national, European, international platforms/registries for tools and NFDI-RDC	42
M3.2.4	<i>Removed (budget cuts)</i>	
M3.2.5	Field report and analysis published (preferably in peer reviewed journal)	60

Comments 10/2020

The time-span for measures on domain-specific cooperation are now regarded as related to cross-NFDI aspects and reduced. One of the two workshops is deleted (M3.2.4).

2nd adaptation of milestones 01/2022

Milest one	Milestone Description	Start of Work (month)	Month
M3.2.1	Test and certification helpdesk started	4 (JAN - 2021)	18 (MAR - 2022)
M3.2.2	Workshop to promote professional profiling, documentation and certification of tools, services and data repositories, together with other NFDI consortia; focus on tools to facilitate the generation of FAIR data	18 (MAR - 2022)	30 (MAR - 2023)
M3.2.3	Cooperation with other NFDI consortia and further additional national, European, international platforms/registries for tools and NFDI-RDC	18 (MAR - 2022)	42 (MAR - 2024)
M3.2.4	<i>Removed (budget cuts)</i>		
M3.2.5	Field report and analysis submitted (preferably in peer reviewed journal)	42 (MAR - 2024)	48 (SEP - 2024)

Comments 01/2022

Please explain changes

The finalisation of M3.2.1 has been delayed and is therefore adapted (in

consultation with TA1 Measure 3).

M3.2.1: The final offer and processes are developed in close collaboration with TA1 Measure 3 as TA3 Measure 2 provides specific support for selected topics within NFDI4Biodiversity. This support offer has to be closely integrated with the standard helpdesk procedures and tools to prevent redundancy.

Please explain interdependencies with other measures/milestones

M3.2.2 and M3.2.3: These milestones are in general related to TA2.

Collaboration and communication with other consortia or international projects will be initialised through the respective Tasks of TA2 (Measure 1 - NFDI, Measure 2 - international).

TA3 Measure 3: Adaptation, Enhancement and Consolidation of NFDI4Biodiversity tool and technical service backbone

Lead: Dr. Dagmar Triebel, Prof. Dr. Birgitta König-Ries, Dr. Ivaylo Kostadinov
Start date (Kick-off): 01.01.2021

This measure is related to the conceptualisation and technical realisation of the RDC. Such RDC in any case requires conceptual and technical amendment on the part of the data centers, which have to handle new data types and data formats and optimize existing workflows towards schema.org or bioschema.org, for example. Measure 3 has minimal financial resources and its realisation is questionable even without reduction of financial support. It includes part-measures which have a lot of innovative conceptual work to do before a realisation could start.

Original work plan

Milestone	Milestone Description	Month
M3.3.1	First workshop with involvement of certificated GFBio data repositories/ data archives and evolving new NFDI4Biodiversity data repositories done together with TA4 M5 Resource Provider Forum”; landscape consolidated and first additional services operational	12
M3.3.2	First enhancement of data pipelines at data repositories towards schema.org and NFDI-RDC compliance done; first optimised highly structured data products for dynamic data sets	24
M3.3.3	Concept for mobilising lab management, experimental design and assay data as well as scientific workflow data in context with LOD approaches and in accordance with FAIR principles published	36
M3.3.4	The structuring of data products with new data types according evolving new schemas realised in a prototypic version; first optimised highly structured data products for experimental design and provenience data (to facilitate reproducibility of biodiversity research results)	48
M3.3.5	Additional archiving and publication services and Web APIs implemented	60

Adapted milestones 10/2020

Milestone	Milestone Description	Month
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M3.3.1	First workshop with involvement of certificated GFBio data repositories/ data archives and evolving new NFDI4Biodiversity data repositories done together with TA4 M5 Resource Provider Forum; landscape consolidated and first additional services operational	18
M3.3.2	First enhancement of data pipelines at data repositories towards schema.org and NFDI-RDC compliance done	24
M3.3.3	Concept for mobilising lab management, experimental design and assay data as well as scientific workflow data in context with LOD approaches and in accordance with FAIR principles published	36
M3.3.4	Funding proposal based on M 3.3.3 and on the structuring of data products with new data types according to evolving new schemas ready (to facilitate repeatability and reproducibility in biodiversity research)	48
M3.3.5	Additional archiving & publication services and Web APIs implemented	60

Comments 10/2020

We propose to reduce the scope of M3.3.4 to developing concepts, without necessarily implementing them and deliver a proposal for alternative funding. Milestone 3.3.2 will concentrate on establishing the RDC-compliance of existing workflows, to enable highly structured data products. However, the data products will not be delivered as part of the milestone, but will be built up continuously throughout the remainder of the project. Milestone 3.3.1 was postponed to month 18 to accommodate the Resource Provider Forum being set up until month 12 (Milestone 4.5.1).

2nd adaptation of milestones 01/2022

Milestone	Milestone Description	Start of work (month)	Month
M3.3.1	Resource providers in NFDI4Biodiversity described and first event in a series of Resource Provider Workshops held together with TA4M5.	4 (JAN - 2021)	18
M3.3.2	First enhancement of data pipelines at data repositories towards schema.org and NFDI-RDC compliance done	19 (APR - 2022)	30

M3.3.3	Concept for mobilising lab management, experimental design and assay data as well as scientific workflow data in context with LOD approaches and in accordance with FAIR principles published	19 (APR - 2022)	36
M3.3.4	Funding proposal based on M 3.3.3 and on the structuring of data products with new data types according to evolving new schemas ready (to facilitate repeatability and reproducibility in biodiversity research)	37 (OCT-2023)	48
M3.3.5	Additional archiving & publication services and Web APIs implemented	49 (OCT-2024)	60

Comments 01/2022

Please explain changes

The only changes compared to the previous version of the milestones is that we postponed M3.3.1 and M3.3.2 by six months. This has been necessary due to higher than expected coordination effort with other measures and delayed on-boarding of personnel. Work towards these milestones is progressing as planned, though.

Please explain interdependencies with other measures/milestones

TA3 is strongly linked to other task areas: On the one hand, many of the use case partners from TA1 are also contributing to TA3. Here, it is necessary to ensure coordinated contact and involvement. On the other hand, the ultimate aim of TA3 is to enable data, tools, and service providers to contribute to and profit from the RDC. To make this possible, concrete requirements by the RDC need to be known. This requires close cooperation with TA1 and TA4.

TA3M1 has alignment with the Milestones TA1M1.2.2, TA1M1.4.1

TA3M2 has alignment with the Milestones TA1M1.2.2, TA1M1.3.1, TA1M1.3.3, TA4M4.5.2

TA3M3 has alignment with the Milestones TA1M1.2.1, TA1M1.3.1, TA4M1, TA4M4.5.2

TA3, in general, has alignment with the Milestones TA1M1.5.1, TA2M2.1.3, TA2M2.1.4., TA2M2.2.5, M4.3.*, M4.4.*

Synchronisation will be ensured via direct involvement of TA3 leads in most of these measures and via SIG-Services.

TA4 - Data integration, exploration, and exploitation - the NFDI-RDC (4all & 4future)

Lead: Prof. Dr. Bernhard Seeger, Prof. Dr. Alexander Goesmann, Dr. Uwe Scholz, Dr. Michael Diepenbroek, Dr. Wolfgang Müller

TA4 Measure 1 - Linking data and service providers with the NFDI-RDC

Lead: Dr. Ivaylo Kostadinov (GFBio e.V.), Co-Lead: Dr. Dagmar Triebel (SNSB)
Start date (Kick-off): 16 (JAN 2022)

Original work plan

Milestone	Milestone Description	Month
M4.1.1	Guidelines for the REST interface are available and a first reference implementation for a provider exist	12
M4.1.2	Data proxies are available and all data providers from GFBio are supported	24
M4.1.3	Special tools for accessing non-compliant data sources are developed	36
M4.1.4	Entire workflows including ETL processes are implemented and successfully tested with various data providers	48
M4.1.5	Dedicated caching mechanism for data proxies are developed and used in various use cases	60

Adapted milestones 10/2020

Milestone	Milestone Description	Month
M4.1.1	Guidelines for the REST interface are available and a first reference implementation for a provider exist	12
M4.1.2	Selected data proxies are available and first data providers from GFBio are supported	36
M4.1.3	<i>Removed (budget cuts)</i>	
M4.1.4	Selected workflows including ETL processes are implemented and successfully tested with various data providers	48

M4.1.5	Removed (budget cuts)	
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Comments 10/2020

- The development of special tools for accessing non-compliant data sources was postponed for the next NFDI phase (M4.1.3 was removed)
- The functionalities developed in M4.1.2 and M4.1.4 will be applied to a selected subset of data providers, GFBio data centers and use cases as a proof of principle.
- Dedicated caching mechanisms for data proxies will be developed in the next NFDI phase (M4.1.5 removed). Caching is considered an optimization and will not affect the general functionality of the system.

2nd adaptation of milestones 01/2022

Milestone	Milestone Description	Start of work	Month
M4.1.1	A technical guideline and a reference implementation for the development of standard interfaces by resource providers is available	22 (JUL 2022)	30
M4.1.2	Workflows for loading and integrating data into RDC established for GFBio data centers and selected use cases	16 (JAN 2022)	24
M4.1.3	Removed (budget cuts)		
M4.1.4	ETL framework for selected data providers implemented and tested	24 (SEP 2022)	48
M4.1.5	Removed (budget cuts)		

Comments 01/2022

Please explain changes

There is a time delay in other TA4 measures and TA3M3. There are also some NFDI cross-cutting aspects and requirements of extension of DataCite metadata standard as a pre-request.

- M4.1.1 as co-work between GFBio e.V. IT team and a service provider exists; push & pull
- M4.1.4: ETL (Extract-Transform-Load) Framework: data proxies, dynamic; The work will be aligned with the developments in the NFDI Section Common-Infrastructures.

Please explain interdependencies with other measures/milestones

Interdependencies are with the general strategy on data flows and their dynamics in NFDI4Biodiversity; TA4.1 technical realisation depends on the RDC technical architecture and standards and is also restricted by the existing (domain-specific) infrastructure of external service providers and data providers. With that, there is a dependency on activities as coordinated by TA3M3.

TA4 Measure 2 - Data integration & harmonization

Lead: Prof. Dr. Adrian Paschke (InfAI), Anton Güntsch (BGBM)

Start date (Kick-off): PM 9 (June 2021)

Original work plan

Milestone	Milestone Description	Month
M4.2.1	Storage solution with caching mechanisms for decentralized resources and common metadata exchange and cataloguing core models published	12
M4.2.2	LOD publication and linking mechanisms and semi-automatic mapping and linking capabilities up and running	24
M4.2.3	Versioning and synchronisation mechanisms implemented	36
M4.2.4	Consensus-building process for terminologies and services implemented	48
M4.2.5	Annotation, adaptable semantic integration and harmonization tools implemented and services running	60

Adapted milestones 10/2020

Milestone	Milestone Description	Month
M4.2.1	Storage solution with caching mechanisms for decentralized resources and common metadata exchange and catalogue of core models published for essential subset of use cases	24
M4.2.2	LOD publication and linking mechanisms and semi-automatic mapping and linking capabilities up and running —Removed (budget cuts)	24
M4.2.2	Versioning and synchronisation mechanisms implemented for internal terminologies of the terminology service	36
M4.2.3	Consensus-building process for terminologies and services agreed upon	48
M4.2.4	Annotation, adaptable semantic integration and harmonization tools implemented and services running	60

Comments 10/2020

- The due date of M 4.2.1 was postponed to M24.
- M4.2.2 was postponed for the next NFDI phase, as it is not essential for a working environment. The due date was postponed to M36.
- M4.2.3 (now M 4.2.2) is now focussing on the terminologies that are managed internally in the terminology service.

2nd adaptation of milestones 01/2022

Milestone	Milestone Description	Start of work	Month
M4.2.1	Storage solution with caching mechanisms for decentralized resources and common metadata exchange and catalogue of core models published for essential subset of use cases	06/21	24
M4.2.2	Versioning and synchronisation mechanisms implemented for internal terminologies of the terminology service	10/21	36
M4.2.3	Consensus-building process for terminologies and services agreed upon	10/22	48
M4.2.4	Annotation, adaptable semantic integration and harmonization tools implemented and services running	10/23	60

Comments 01/2022

Please explain changes

No changes

Please explain interdependencies with other measures/milestones

None described

TA4 Measure 3 - Storage infrastructure

Lead: Prof. Dr. Alexander Goesmann (Uni Gießen), Prof. Dr. Bernhard Seeger (Uni Marburg)

Start date (Kick-off): 01.01.2021

Original work plan

Milestone	Milestone Description	Month
M4.3.1	Workshop to discuss the initial design of the REST API and finished deployment of basic storage components (MongoDB, PostgreSQL)	6

M4.3.2	Prototype implementation of cloud-based storage infrastructure and first draft requirements for the semantic storage implementations	18
M4.3.3	Working implementations of the semantic storage solutions	30
M4.3.4	Scalable storage solutions available	48
M4.3.5	Final implementation of scalable storage infrastructure on multiple sites	60

Adapted milestones 10/2020

Milestone	Milestone Description	Month
M4.3.1	Workshop to discuss the initial design of the REST API and finished deployment of basic storage components (MongoDB, PostgreSQL)	12
M4.3.2	Prototype implementation of cloud-based storage infrastructure and first draft requirements for the semantic storage implementations	22
M4.3.3	Working implementations of the semantic storage solutions	36
M4.3.4	Scalable storage solutions available	60
M4.3.5	<i>Removed (budget cuts)</i>	

Comments 10/2020

- A scalable storage infrastructure on multiple sites will be implemented in the next NFDI phase (M4.3.5 removed). Local components should however plan accordingly for this from the beginning.
- The due date of all remaining Milestones were postponed.

2nd adaptation of milestones 01/2022

Milestone	Milestone Description	Start of work	Month
M4.3.1	Workshop with software developers to adopt the initial design of the REST API. Deployments of basic storage components (e.g. MongoDB, PostgreSQL) in the core storage is available.	04	20

M4.3.2	Prototype implementation of cloud-based storage infrastructure is available . Based on a given list of requirements, a design for the semantic storage exists.	10/2020	24
M4.3.3	Working implementations of the semantic storage solutions are available for at least three use-cases	12/2021	36
M4.3.4	Scalable storage solutions available	10/2020	60
M4.3.5	<i>Removed (budget cuts)</i>		

Comments 01/2022

Please explain changes

Please explain interdependencies with other measures/milestones

Work is in part dependent on the delivery of requirement lists from use case projects

- M4.3.2: A collaboration and synchronisation with TA3.M3 is essential.
- MContinuous Measure)

TA4 Measure 4 - Software application frameworks

Lead: Dr. Uwe Scholz, Prof. Dr. Bernhard Seeger, Prof. Dr. Alexander Goesmann

Start date (Kick-off): 01-OCT-2021

Original work plan

Milestone	Milestone Description	Month
M4.4.1	Design of elastic compute infrastructure finished	6
M4.4.2	Access to collaborative workspace environment established	12
M4.4.3	Training and support platform established and operational	24
M4.4.4	Data and service discovery portal available	36
M4.4.5	Integrated tools for analysis and visualization available	48
M4.4.6	Full access to scalable tools and workflows via containers	60

Adapted milestones 10/2020

Milestone	Milestone Description	Month
M4.4.1	Requirement analysis and design of elastic compute infrastructure finished	9
M4.4.2	Data discovery portal available	12
M4.4.3	First training and support platform established and operational	36
M4.4.4	Service discovery portal available	48
M4.4.5	Selected container-based integrated tools for analysis and visualization available	60
M4.4.6	<i>Reduced and combined with M4.4.5</i>	

Comments 10/2020

- M4.4.1: Due to extensive change in the work plan, caused by the reduced budget, the technical requirements have to be re-evaluated. The due date was postponed to PM 9.
- Access to a collaborative workspace environment will be provided in the next NFDI phase (M4.4.2 removed).
- Data Discovery Portal will be developed early on, in a dedicated

Milestone (M4.4.2). The Service Discovery Portal (M4.4.4) will be delivered later on (PM 48).

- The scope of M4.4.3 and M4.4.5 will be reduced to a selected number of training/support topics and integrated tools for analysis and visualization.
- The scope of M4.4.6 was reduced and combined with M4.4.5. Therefore, the due date of M4.4.5 was postponed to PM 60.

2nd adaptation of milestones 01/2022

Milestone	Milestone Description	Start of work (month)	Month
M4.4.1	Requirement analysis and design of elastic compute infrastructure finished		9
M4.4.2	First version of data discovery portal available	13 (SEP - 2021)	24
M4.4.3	First training and support platform established and operational	20 (MAY - 2022)	36
M4.4.4	First version of service discovery portal available	37 (SEP - 2023)	48
M4.4.5	Selected container-based integrated tools for analysis and visualization available	13 (OCT - 2021)	60
M4.4.6	<i>Reduced and combined with M4.4.5</i>		

Comments 01/2022

Please explain changes

- In the September 2021 Milestone Report, the milestone M4.4.1 was moved to month 21.
- M4.4.1: After discussion in the TA4 Jour Fixe it was decided to delete this milestone. The elastic compute is not essential for the success of this measure and can be implemented additionally if applicable.
- ~~Renumbering of all milestones in M4-Rückgängig gemacht~~
- M4.4.2 and M4.4.4: These milestones were formulated more realistically and reduced to “first versions”.
- M4.4.2: Month adapted based on the milestone report from September 2021.

Please explain interdependencies with other measures/milestones

- A synchronisation with TA1 is essential on several levels - especially for user training and the development or re-use of training materials. To achieve this, an agreement has been made with Daniel Tschink (NFDI4Biodiversity Training Coordinator).
- M4.4.3 (Training platform) has to be coordinated with the platform

mentioned in TA1 Measure 4 and will support activities planned in TA1 Measure 2 (Support with tools)

- M4.4.2 and M4.4.4: The general developments of “self-describing” discovery portals in GAIA-X should be considered.
(https://www.gaia-x.eu/sites/default/files/2021-10/Gaia-X_Architecture_Document_2109.pdf)

TA4 Measure 5 - Governance & monitoring

Lead: Dr. Michael Diepenbroek, Prof. Dr. Jens Stoye, n.n.

Start date (Kick-off): February 2022 (PM 15, first Meeting with Contributors)

Original work plan

Milestone	Milestone Description	Month
M4.5.1	Initiation of resource provider forum finished	12
M4.5.2	Rules for participation established	24
M4.5.3	Authentication and Authorization available	36
M4.5.4	Technical monitoring and performance measurements available	48
M4.5.5	User monitoring and research metrics established	60

Adapted milestones 10/2020

Milestone	Milestone Description	Month
M4.5.1	Initiation of resource provider forum finished	12
M4.5.2	Rules for participation established	24
M4.5.3	Authentication and Authorization available	36
M4.5.4	Technical monitoring and performance measurements available	60
M4.5.5	<i>Removed (budget cuts)</i>	

Comments 10/2020

- User monitoring and research metrics will be developed in the next NFDI phase, since not essential for the operation of the RDC (M4.5.5 removed)
- The due date of M4.5.4 was postponed to PM 60.

2nd adaptation of milestones 01/2022

Milestone	Milestone Description	Start of work	Month
M4.5.1	<i>Refactored due to NFDI developments</i> Initiation of resource provider forum finished		12

M4.5.2	Rights, obligations and accountabilities for the consortium's RDC reference implementation sorted and discussed in a series of workshops with NFDI4Biodiversity resource providers (output: report; to be shared with NFDI section Infra) Rules for participation established	15	24
M4.5.3	NFDI4Biodiversity Authentication and Authorization Infrastructure available in place (based on ELIXIR) and evaluated with Use Cases (output: report to be shared with NFDI section Infra)	15	24
M4.5.4	First set of monitoring and performance measurements for defined KPIs agreed and available for the consortium's RDC reference implementation	15	30
M4.5.5	<i>Removed (budget cuts)</i>		

Comments 01/2022

Please explain changes

M4.5.1 - The Resource Provider Forum was originally meant to “be established as part of the cross-cutting topics to manage the rules for participation and to detect new emerging needs like third-party resources”. Its function is partially superseded by the cross-cutting section common infrastructures in NFDI (chaired by M. Diepenbroek et al.). Relations between providers of resources within NFDI4Biodiversity can be negotiated in the consortium partner meeting and dedicated workshops.

Therefore, M4.5.1 (the Forum) has been merged with M4.5.2 (establish rules for participation). The idea is to develop the necessary terms and conditions for RDC usage in a series of workshops. This will also allow for synchronisation with TA3 regarding resource provider communication and management.

M4.5.3 is the milestone for Action 2 and was originally meant to “(...) develop a uniform infrastructure for authentication and authorization to simplify usage of resources in (...) the entire NFDI and beyond.” This has been superseded by current developments in the NFDI, where the establishment of a common AAI is realised (with support of NFDI4Biodiversity). For consortia purposes, a domain-specific AAI is available and can be in place by the end of year 2.

For M4.5.4 it was decided that at least some statistics should be available in time for the interim report to the DFG. The due date has been moved forward.

Please explain interdependencies with other measures/milestones

This measure is highly intertwined with other activities of the project

- Strong relation between Action 1 and TA5:
 - The Resource Provider participation process needs to be integrated into the governance (TA5M1); the “Rules for Participation” / Terms and

conditions for resource providers are relevant for the sustainability concept (TA5M2). Communication should be ensured with TA5M2 to synchronise timing.

- Strong relation between Action 1 and TA3
 - Both want to achieve the integration of resource providers, participation models and communications should be synchronised; the person groups agreed for each type of resource provider
- Co-dependency with TA4 Measures 1-4
 - Decision in Action 2 (AAI) influences technical implementation
 - Progress in Action 3 (Monitoring/KPI) depends on availability of services
- Contributions to SIG3 Service Monitoring and TA3 M1
 - Integration of Action 3 (Monitoring/KPI) in the Service quality monitoring strategy (PM 18)
- Relevance for SIG5 Strategy
 - the “Rules for Participation” / Terms and conditions for resource providers should be discussed by the SIG5 prior to the Steering Committee.

TA5 – Coordination, Collaborative governance & sustainability

Lead: Prof. Dr. Frank Oliver Glöckner, Dr. Barbara Ebert, Prof. Dr. Jörg Overmann

In this task area, the governance model and coordination of NFDI4Biodiversity will be implemented, following the governance model proposed in section 2.5.

TA5 Measure 1 – Coordination and collaborative governance

Lead: Dr. Barbara Ebert, Prof. Dr. Frank Oliver Glöckner, Prof. Dr. Jörg Overmann

Start date (Kick-off): October 2020 (PM 01)

In this measure, GFBio e.V. will build up a team of scientific coordinators to support and interconnect the work done in the task areas, as well as an HR Pool for IT and Software development tasks.

Original work plan

Milestone	Milestone Description	Month
M5.1.1	Personnel hired, special interest groups established, Scientific Advisory Board and Board of Governors established	12
M5.1.2	Collaborative governance and decision workflows established with NFDI directorate	18
M5.1.3	Evaluation procedures for centrally managed funds established	24
M5.1.4	Common legal framework for NFDI established	48
M5.1.5	Transition of NFDI4Biodiversity finished	60

Adapted milestones 10/2020

Milestone	Milestone Description	Month
M5.1.1	All elements of the Consortium Governance established, Transition from GFBio project completed	12

M5.1.2	Collaborative governance and decision workflows established with NFDI directorate	18
M5.1.3	Evaluation procedures for centrally managed funds established	24
M5.1.4	<i>deleted, will be established by directorate</i>	48
M5.1.5	NFDI4Biodiversity preparations for funding phase 2 finished	60
M5.1.6 (new)	Progress report submitted to funder	36

Comments 10/2020

In the adapted work programme, staff will be subsequently built up, as the NFDI4Biodiversity staff will supersede part of the GFBio project team in the fall of 2021. This concerns mainly the training and regular helpdesk activities in the area of data management. Respective NFDI4Biodiversity activities will be put off until GFBio has finished. The tasks of the interoperability manager will be distributed among the Task Area 2 Lead, the Cross-Community coordinator and IT staff of the HR Pool. Resources for the HR Pool have been reduced and part of the work will be transferred to volunteer staff in the wider research community, f.e. specialized data cleaning tasks. The centrally managed funds were reduced by 25%. Specifically, the budget of 500,000 Euro for onboarding additional participants at a later stage was omitted (Section 2.2 of the NFDI4Biodiversity grant application, p. 34).

2nd adaptation of milestones 01/2022

Milestone	Milestone Description	Start of work	Month
M5.1.1 COMPLETED	All elements of the Consortium Governance established, Transition from GFBio project completed	01	12
M5.1.2 COMPLETED	Integration into the NFDI Governance established [was: Collaborative governance and decision workflows established with NFDI directorate]	01	18
M5.1.3	Evaluation procedures for centrally managed funds established Management for central funds established	17	24
M5.1.4	<i>deleted, will be established by directorate</i>	-	48
M5.1.5	NFDI4Biodiversity preparations for funding phase 2 finished	37	60

M5.1.6	Interim report submitted to funder	14	36
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Comments 01/2022

Please explain changes

M5.1.3 Formal evaluation procedures planned through SIG 4 (Grants) will be dropped due to limited available flexible funding options. Evaluation of requests from the central funds could be directly handled in the SC, the coordination will develop a process.

Please explain interdependencies with other measures/milestones

Milestone 5.1.6 (interim report) would profit strongly from central concepts and strategies being ready from other measures in time for the audit. Also, project-related publications could serve to demonstrate transparent communication of project results.

TA5 Measure 2 - Sustainability and business model

Lead: Dr. Janine Felden, Dr. Barbara Ebert, Prof. Dr. Jörg Overmann

Start date (Kick-off): January 2022 (PM16)

Original work plan

Milestone	Milestone Description	Month
M5.2.1	Sustainability concept and in-kind contributions elaborated	18
M5.2.2	Service portfolio and cost model established	36
M5.2.3	Sustainability concept as part of NFDI discussed	48
M5.2.4	Exit strategy elaborated	60
M5.2.5	All data and source code publicly available	60

This measure involves all contributors in the project. The original work plan will be followed. Due to budget cuts, the staff resources foreseen for engagement outside the consortium are less than expected, but care will be taken to represent the interests of NFDI4Biodiversity and its research community to the best possible extent in the ONE NFDI and among the other consortia.

2nd adaptation of milestones 01/2022

Milestone	Milestone Description	Start of work	Month
M5.2.1	Sustainability assessment of the service structure	18	30
M5.2.2	Service portfolio and cost model established <i>Deleted, see explanation below</i>		
M5.2.3	Sustainability concept as part of NFDI discussed	36	48
M5.2.4	Exit strategy elaborated	54	60
M5.2.5	All data and source code publicly available	04	60

Comments 01/2022

Please explain changes

M5.2.1 ist adapted to deliver required information for the interim report regarding the reliability and sustainability as well as the financing of the infrastructures/structures the consortium uses.

M5.2.2 dropped for this phase. Establishment of service portfolio has priority, cost models can only be calculated after this is done.

Please explain interdependencies with other measures/milestones

- Elaboration of the service portfolio (M5.2.3) depends on preparatory work of TA3
- Rules for participation /TA4 M5 Action 1 should be developed with a view to the sustainability concept of NFDI4Biodiversity

(Co-) Applicant Contributions

UniBremen-MARUM

Original

UniBremen-MARUM together with AWI provides the information system PANGAEA staffed with around 25 highly skilled research data managers, data curators and data scientists in Bremen and Bremerhaven (10 with permanent positions). This includes professional user support (helpdesk), training of curators and users as well as software tools for research data management and analysis. The PANGAEA Editorial system will be adapted and maintained for NFDI4Biodiversity. In addition, MARUM will provide standard based web services and interfaces for the distribution of PANGAEA content within the NFDI as well as in an international context. Total in kind contribution equals to 2 FTEs per year plus long-term storage capacities at AWI Bremerhaven (20,000 Euro/year).

Adapted

Not changed.

BGBM

Original

BGBM contributes its data archive and publication capacities for research data. Furthermore, BGBM offers its taxonomic services for free usage within the framework of NFDI. Total in kind contribution equals to 0.5 FTEs per year for the development and operation of the NFDI4Biodiversity infrastructure. This includes the adaptation and operation of BioCASE components and GGBN interfaces.

Adapted

Not changed.

BIBI

Original

BIBI will provide access to its large user community as well as training courses, data analysis tools, the de.NBI cloud and microbial bioinformatics as part of its established activities in the de.NBI network and the ELIXIR-Germany node. Total in kind contribution equals to 1,5 FTEs.

Adapted

Not changed.

DSMZ

Original

DSMZ provides the database on bacterial and archaeal phenotypic data BacDive, the Type Strain Genome Server (TYGS) comprising genome-based prokaryotic taxonomy and moreover the taxonomy service Prokaryotic Nomenclature Up-to-date (PNU) that tracks changes in the nomenclature and offers a database of valid names and renaming. Currently, the research data center comprises a core of six highly skilled experts together with a background of approx. 50 scientists at the DSMZ. Total in kind contribution equals to 3 FTEs per year. DSMZ seeks to obtain permanent institutional funding to extend and maintain its capacity in microbial biodiversity databases and research data management via an “Sondertatbestand” in 2022. If successful, this extension of the core of the entire research data center would encompass 20 experts with permanent positions to back-up NFDI4Biodiversity.

Adapted (01/2022)

DSMZ provides the database on bacterial and archaeal phenotypic data BacDive, the Type Strain Genome Server (TYGS) comprising genome-based prokaryotic taxonomy, the List of Prokaryotic names with Standing in Nomenclature (LPSN) and moreover the taxonomy service Prokaryotic Nomenclature Up-to-date (PNU) that tracks changes in the nomenclature and offers a database of valid names and renaming. Currently, the research data center comprises a core of six highly skilled experts together with a background of approx. 50 scientists at the DSMZ. Total in kind contribution equals to 2 FTEs per year. DSMZ seeks to obtain permanent institutional funding to extend and maintain its capacity in microbial biodiversity databases and research data management via an “Sondertatbestand” in 2023. If successful, this extension of the core of the entire research data center would encompass 20 experts with permanent positions to back-up NFDI4Biodiversity.

FBN

Original

FBN provides a database linking various ‘omics’ data to animals and redundantly manually and automatically recorded phenotypic data of farmed animals. The FBN will contribute to networking by collaboration the NFDI4Agri in particular in regard to standards, interoperability and FAIR. Total in kind contribution equals to 0.5 FTEs per year for data management, administration and operation of server and database infrastructure within NFDI4Biodiversity and beyond project funding.

Adapted

Not changed.

GFBio e.V.

Original

GFBio e.V. will dedicate its workforce towards the coordination and maintenance of NFDI4Biodiversity. It offers its financial and administrative structures to employ the additional coordinators needed for the professional management of NFDI4Biodiversity.

Adapted

Not changed.

GWDG

Original

GWDG contributes its GFBio-related service portfolio to NFDI4Biodiversity including the required storage and compute capacities. GWDG will provide its own software developments in this area and beyond (in particular regarding repository solutions) as background. Total in kind contribution equals to 1 FTEs per year plus infrastructure services of 15,000 Euro/year.

Adapted

Not changed.

HITS

Original

HITS provides the FAIRDOME software stack including the SEEK system, a research data commons software that is the basis of the FAIRDOMEHub data resource. The Rightfield software for enriching spreadsheets with ontology information and tools & expertise on spreadsheet/CSV related tooling for the “first mile” of data ingestion. Total in kind contribution equals to 0.2 FTEs per year plus HITS infrastructure and salary top-up.

Adapted

HITS provides the FAIRDOME software stack including the SEEK system, a research data commons software that is the basis of the FAIRDOMEHub data resource. The Rightfield software for enriching spreadsheets with ontology information and tools & expertise on spreadsheet/CSV related tooling for the “first mile” of data ingestion. Due to roles in the steering committee as well as in scientific & engineering discussion, total in kind contribution is far above the funding reliably received within the project. We currently estimate

our contribution to be 0.2 FTEs per year plus HITS infrastructure plus salary top-up if hiring is possible.

IPK

Original

IPK provides the genebank information system GBIS/I and the data publication repository Plant Genomics and Phenomics Research Data Repository e!DAL-PGP to NFDI4Biodiversity. Next, IPK will contribute expertise and consultancy for RDM, a substantial amount of software development capacities and the IT infrastructure including backup. Total in kind contribution equals to 0.5 FTEs per year to operate the IPK offered services within NFDI4Biodiversity and beyond project funding.

Adapted

Not changed.

SNSB

Original

SNSB with its data center provides the Diversity Workbench (DWB) and the open source database management system for NFDI4Biodiversity. This includes the DWB helpdesk, regular workshops together with training material, DWB cloud services and user support. Additionally, all basic operations of the SNSB IT Center infrastructure (server cluster, storage network, archiving solutions in cooperation with the Leibniz-Rechenzentrum München) and workflows for data publication as well as the access to data repositories are provided. Total in kind contribution equals to 1 FTEs per year plus infrastructure services of 7,000 Euro/year.

Adapted

SNSB with its data center provides the Diversity Workbench (DWB) and the open source database management system for NFDI4Biodiversity. This includes the DWB helpdesk, regular workshops together with training material, DWB cloud services and user support. Additionally, all basic operations of the SNSB IT Center infrastructure (server cluster, storage network, archiving solutions in cooperation with the Leibniz-Rechenzentrum München) and workflows for data publication as well as the access to data repositories are provided. Total in kind contribution equals to 0.75 FTEs per year plus infrastructure services of 7,000 Euro/year.

UFZ

Original

UFZ provides the modular web platform for biodiversity data (ModWebBioDiv), which is built as open source frontend with several modules allowing to adjust the frontend to specific community needs as well as an API to connect it to different types of backends. Furthermore, UFZ provides the UFZ Data Portal as an infrastructure for biodiversity related data sources including abiotic data streams. Total in kind contribution equals to 2 FTEs per year plus server, storage and high-end computing capacities of 45,000 Euro/year.

Adapted

Not changed.

UniGießen

Original

UniGießen is one of the six hosting sites of the de.NBI cloud infrastructure. Facilities include a high-performance compute cluster with 800 CPU cores for parallel processing and several high-capacity application servers with a main memory capacity of up to 3 TB and up to 160 CPU cores in a single machine. The main data storage comprises a total online capacity of 7 PB. Total in kind contribution equals to 0,75 FTEs per year plus server, storage and high end computing capacities of 19,500 Euro/year. Additional de.NBI cloud resources free of cost can be assigned based on a lean project proposal.

Adapted

UniGießen is one of the six hosting sites of the de.NBI cloud infrastructure. Facilities include a high-performance compute cluster with 800 CPU cores for parallel processing and several high-capacity application servers with a main memory capacity of up to 3 TB and up to 160 CPU cores in a single machine. The main data storage comprises a total online capacity of 16 PB. Total in kind contribution equals to 0,5 FTEs per year plus server, storage and high end computing capacities of 19,500 Euro/year. Additional de.NBI cloud resources free of cost can be assigned based on a lean project proposal.

UniJena/iDiv

Original

UniJena/iDiv provides the Jena Data Center as a sustainable umbrella for a set of BEXIS2 instances and other long-term data sources. This includes the Research Data Management helpdesk to support the users of this data center. Total in kind contribution equals to 1.5 FTEs per year plus server and long-term storage of 20,000 Euro/year.

Adapted

Not changed.

UniMarburg

Original

UniMarburg provides expertise, resources and strong networking in RDM and education. The RDM-team will actively promote NFDI4Biodiversity to biodiversity researchers at the University of Marburg as well as to other universities in Hesse and beyond. The database research group commits its cloud computing infrastructure for development and testing and examining cloud-based software solutions for its use within NFDI4Biodiversity. Total in kind contribution equals to 0,5 FTEs per year, a cloud system with 10 compute nodes and 200 TB of storage, plus 10,000 Euro/year for the maintenance of the cloud system and maintenance of the NFDI-RDC for five years in case NFDI4Biodiversity is not continued.

Adapted

Not changed.